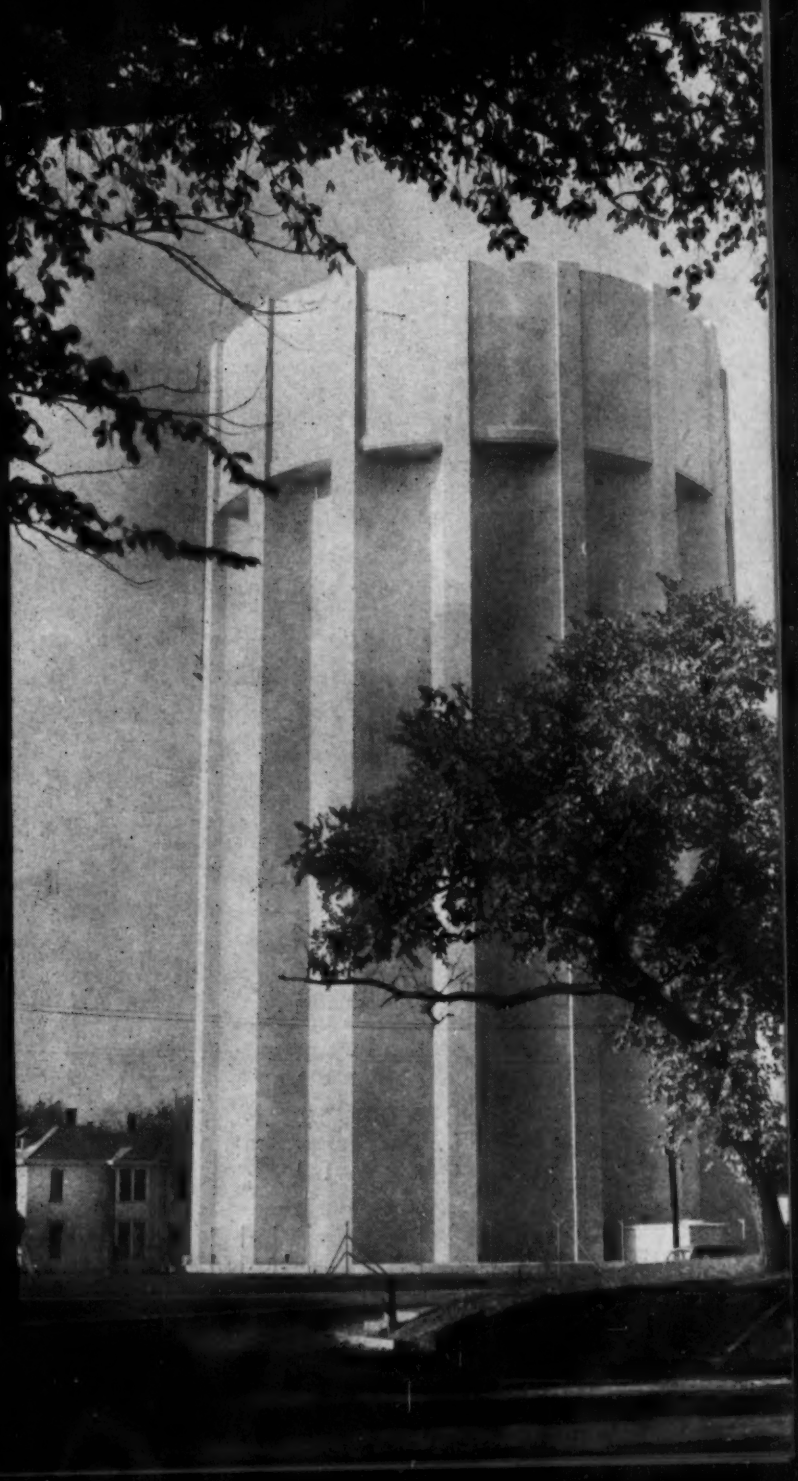
WATER WORKS & SEWERAGE



IS PERFORMING DISTINGUISHED SERVICE

If ever a chemical deserved a military medal, it's chlorine! It is always with the advance spearhead of attack . . . Its compounds land with the first invasion troops . . . Serving on duty everywhere in the field during every campaign — fighting the battle against water-borne disease.

Chlorine and its compounds serve both the army and the navy from the time a man enters the service until he's mustered out.

Chlorine's most important function is the protection of drinking water. But it's also used by the medical corps as a bactericide. It's a bleach and sanitizing agent in camp laundries. And, in footbaths it guards against common infections.

All this is vitally important — and to this service Penn Salt devotes a large percentage of its output of chlorine and chlorine compounds. With facilities expanded and service augmented by this wartime experience, Penn Salt is now equipped to serve you better when peace returns.

Perchloron
REG. U.S. PAT. OFF.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals
1000 WIDENER BUILDING, PHILADELPHIA 7, PA.
NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • MINNEAPOLIS • WYANDOTTE • TACOMA

Water Meters

Composite view of Pittsburgh Equitable Meter Company factories.

MADE RIGHT TO MEASURE RIGHT!

Present day meter manufacture requires ingenuity and the all-important "know how", based upon years of experience. The Pittsburgh-National organization has the most advanced facilities with which to attack today's difficult problems. On the premise laboratories, exacting field tests and consulting advice from our Meter Fellowship at the World's leading research organization have all contributed mightily to the line of meters that we can offer buyers under the W.P.B. limitation order. They are the best meters that can be made under existing conditions. Any of these meters can be purchased with full confidence of receiving top measurement value and many years of satisfactory service.

Naturally, the water works industry can look forward, as always, to Pittsburgh-National for superior meter designs, materials and construction methods after the conflict is over.

Good Care Means Longer Wear!

The millions of meters now in service constitute one of the most valuable possesions in the hands of water plants today. We urge operators to take adequate care of them. An immediate program of inspection and test will hold scrap meters to a minimum. There are adequate repair parts available to keep the great majority of existing meters in service for the duration. Make "let's keep 'em measuring" be the slogan for all—meter user and meter manufacturer alike—until Victory is ours.

PITTSBURGH EQUITABLE METER COMPANY

Atlanta, Boston, Brooklyn, Buffalo, Chicago, Columbia, Houston

MERCO NORDSTROM VALVE COMPANY

Main Offices, Pittsburgh, Pa.

Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle, Tulsa

NATIONAL METER DIVISION, BROOKLYN, N. Y.

PITTSBURGH-NATIONAL IRON CASE WATER METERS

PIRE VICTORY METERS
Sizes ⅝" and ¾" x ¾"

IRONSIDE WATER METERS
Sizes ⅝" through 2"

EMPIRE TYPE 9 METERS
Sizes ¾" and 1"

GEM WATER METERS
Sizes 2" through 10"

EMPIRE LARGE CAPACITY METERS

EMPIRE COMPOUND METERS
Sizes 3" through 12

THERE'S ONLY ONE NAME FOR ALL THESE ADVANTAGES...

VICTAULIC

1 Fast Self-Aligning permits angular deflection!

2 Leak-tight, self-sealing under pressure or vacuum!

3 Positive mechanical lock of pipe lengths!

4 Every joint is a pipe union!

5 Every joint an expansion joint!

6 Available for all pipe sizes 3/4" through 60"!

BUY MORE WAR BONDS!

Copyright 1944 by Victaulic Co. of America

The engineer who knows... specifies VICTAULIC... the registered trademark name of the original bolted, clamp-type mechanical coupling!

NEW... VICTAULIC CATALOG-MANUAL!

If you use pipe... here's everything that anybody in your organization needs to specify, order, and install Victaulic Couplings and Full Flow Elbows, Tees and other fittings. Smartly bound, easy-to-use. A must for your permanent files! Drop us a line on your firm's letterhead... and we'll reserve your copy.

MUNICIPAL

VICTAULIC

Reg. U. S. Pat. Off.

SELF-ALIGNING PIPE COUPLINGS AND FULL-FLOW FITTINGS

VICTAULIC COMPANY OF AMERICA, 30 Rockefeller Plaza, New York 20, N. Y.; Victaulic Inc., 727 West 7th St., Los Angeles 14, California; Victaulic Co. of Canada, Ltd., 200 Bay St., Toronto.

Biased about this compound!

SURE...we are!

BUT WHAT DO YOU THINK OF THIS:

• Probably no amount of sales talk is quite so convincing as a demonstration. So, to see what a typical joint made with *Tegul*-MINERALEAD could stand, we made this radical experiment:

We took two 12' lengths of Bell & Spigot pipe, jointed them with *Tegul*-MINERALEAD and set them up to form a span 19' between supports • Next we rigged a power hammer, a 4 x 4" beam secured at one end and actuated by cam and pulley drive • To give it weight, we bolted a 50 lb. chunk of iron to the impact end, which was centered over the *Tegul*-MINERALEAD joint • Power was turned on and for FIFTEEN HOURS without pause, the joint was pounded — 100 blows a minute — 90,000 whamming impacts, each delivering tremendous punishment • Throughout this tough test, 90 lbs. water pressure was maintained in the pipe. At the end of the ordeal, the joint was as dry as at the start. THERE WASN'T A SIGN OF A LEAK.

• In fifteen hours that joint withstood far more punishment than it would meet under the worst conditions in service in FIFTEEN YEARS . . . and that's putting it conservatively.

• TODAY you *must* conserve time and labor by having your water lines *right*. Using *Tegul*-MINERALEAD you give yourself a tiptop chance to stay out of trouble for a long, long time.

TO SUPER-PERFORMANCE, ADD THAT:

. . . joints, made as directed with *Tegul*-MINERALEAD take up initial leakage quickly. Back filling can be commenced at once, clearing up traffic hazards due to construction work • Also — made in 10 lb. ingots, *Tegul*-MINERALEAD is easy to handle, ship and store — cannot change its chemical composition, no matter how much it may be jolted in transit to the job. Correctly mixed at our factory, it stays that way until used • *Tegul*-MINERALEAD requires no caulking, deep bell holes or skilled labor . . . and, using it, you help conserve lead, a strategic war metal.

• If you're not already using *Tegul*-MINERALEAD, do yourself a good turn by writing for complete information about its advantages and economies. Address us here at Mertztown.

Tegul-MINERALEAD

THE ATLAS MINERAL PRODUCTS COMPANY

of Mertztown Penna. Pennsylvania

THE House Jointing Materials

*ATLANTA 3, Ga., 610 Red Rock Bldg.
*CHICAGO 1, Ill., 333 No. Michigan Ave.
*DALLAS 5, Tex., 3921 Purdue St.
*DETROIT 2, Mich., 2970 W. Grand Blvd.
*JACKSONVILLE 5, Fla., 1463 Talbot Ave.
*KANSAS CITY 2, Kan., 1913 Tauromee Ave.
NEW YORK 16, N. Y. 280 Madison Ave.
PITTSBURGH 10, Pa., 4656 Old Boston Rd.
TORONTO, Ont., McRae Engineering Equipment, Ltd. 11 King St., West

THE ATLAS MINERAL PRODUCTS COMPANY of California
REDWOOD CITY, California

*DENVER 2, Col. 1921 Blake St.
*HONOLULU 2, Hawaii, U. S. A.
*LOS ANGELES 12, Cal., 817 Yale St.
*SEATTLE 14, Wash., H. D. Fowler Company P. O. Box 3084

*Stocks carried at these points

LET'S LOOK AT THE FUTURE

There will come a day—not too far distant—when our boys will come marching home again. They'll want jobs after the cheering dies down. Long-delayed waterworks improvements and other municipal projects will be needed to supply this work while industry goes through its post-war adjustments.

The most important New Year's Resolution you can make is the resolve to get post-war plans under way at once—to back-up your BLUE PRINT NOW Committee and be ready to break ground when the day arrives.

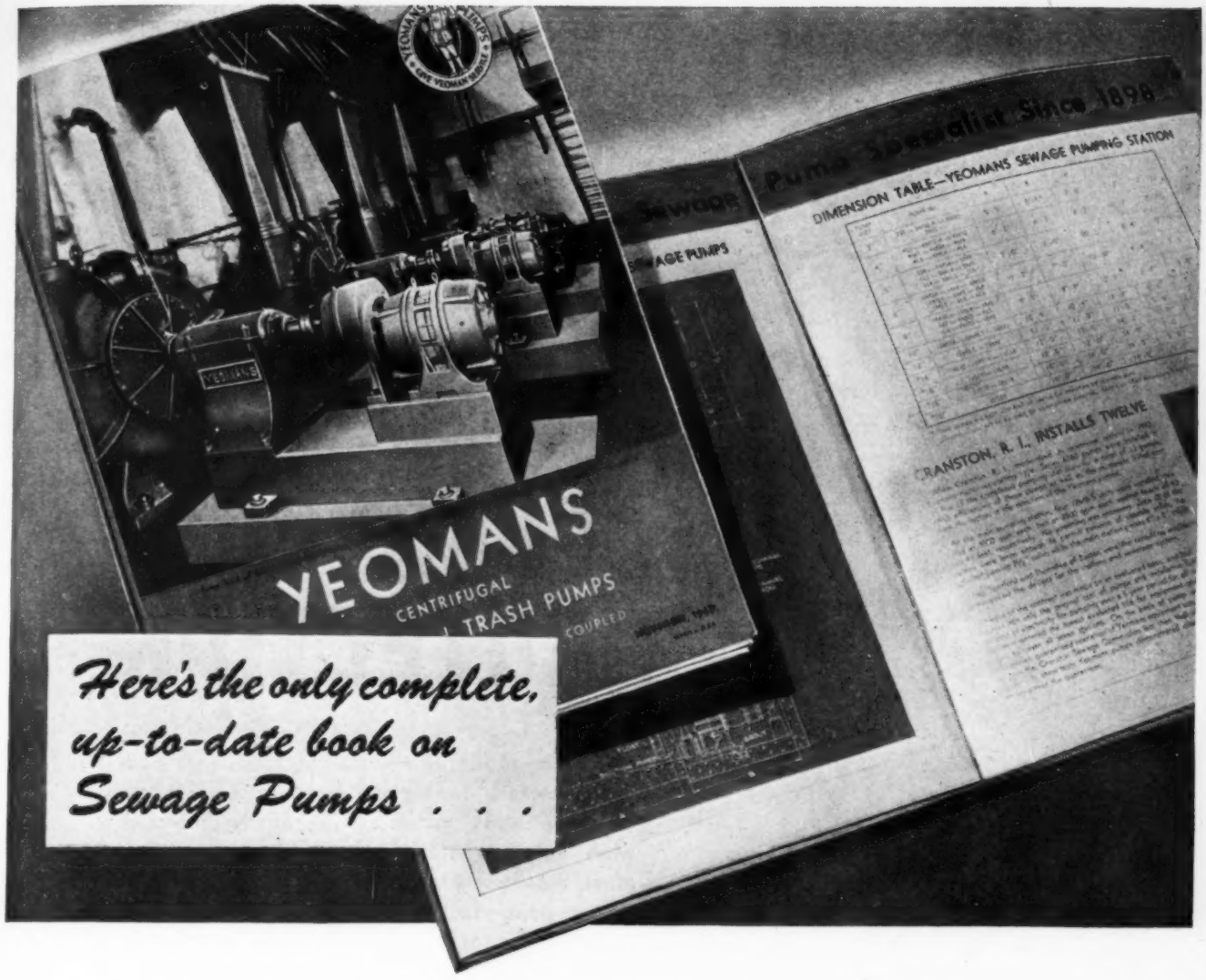
MATHEWS HYDRANTS

400 CHESTNUT STREET, PHILADELPHIA, PA.

ESTABLISHED IN 1803

Made by R.D. WOOD Company

MANUFACTURERS OF SAND SPUN PIPE (CENTRIFUGALLY CAST IN SAND MOLDS) AND R. D. WOOD GATE VALVES



Here's the only complete, up-to-date book on Sewage Pumps . . .

IF YOU are interested—or expect to be—in sewage and trash pumps for municipal and industrial uses, you need the new Yeomans Bulletin 6201 . . .

- 32 pages of data essential to selecting the right type of pump to fit any given set of conditions—
- Horizontal and vertical pumps; close-coupled and motor-supporting types; ball and Timken Roller bearing equipped units; solid and split volute types—
- Cross section drawings, selection tables, typical specifications.

You'll find this bulletin exceedingly helpful—full of the practical, usable material you want in your data file.

Use the coupon and your copy will be sent promptly.

Yeomans Brothers Company

1423 NORTH DAYTON STREET
CHICAGO 22, ILLINOIS

YEOMANS PUMPS • GIVE YEOMAN SERVICE •

Please send me your Bulletin 6201.
Name_____
Address_____
Company_____

DEPENDABLE PROTECTION

No amount of war time economies, such as stepped up water meter testing and repair work will be of any value if your meters are improperly protected when installed. Vibrations, shifting and settling pipes, misalignment, heavy loads on the meter box are negative factors contributing to damaged meters or improper registering of the water used.

One sensible way to eliminate these faults is to install MUELLER Meter Yokes. Pipes are held in axial alignment with the MUELLER yoke. The meter cannot get out of line so it is fully protected. Meter is quickly installed or removed. Pipe can be put in permanently before the meter is needed. The built-in stop makes it possible to remove meters at any time without tinkering with the pipes.

As a companion piece, protect your meters further with the MUELLER Meter Box Cover. The truss type design provides maximum strength with minimum weight. The worm type lock prevents tampering and is made to force the lid open or closed. Lid cannot stick. Bronze parts prevent rust. Here is the best cover made. . . Ask us about these items today.

H-10840 METER YOKE

H-10810 METER BOX COVER

MUELLER CO.
DECATUR B, ILL.
FOUNDED 1857

BLUE PRINTING NOW?

here's how HOOKER *can help*

Our experience in supplying HOOKER Chemicals for water purification, slime control and sewage treatment to municipalities and private utilities from coast to coast may be helpful to post war planners in three distinct ways:

WE OFFER:

Complete data on the HOOKER Chemicals now widely used by Sanitary Engineers — Bleaching Powder, Caustic Soda, Chlorine and Ferric Chloride Solution. Our recommendations on the use, handling and storage of these chemicals can be valuable in planning the layout.

Technical data and advice on the properties and use of other HOOKER Chemicals, which total over a hundred. A knowledge and use of one or more of these chemicals may improve the efficiency of the system you intend to use.

Our laboratory facilities are available for research on new chemicals, built to your specifications, for after-the-war use.

We offer this help, and a source of reliable chemicals.

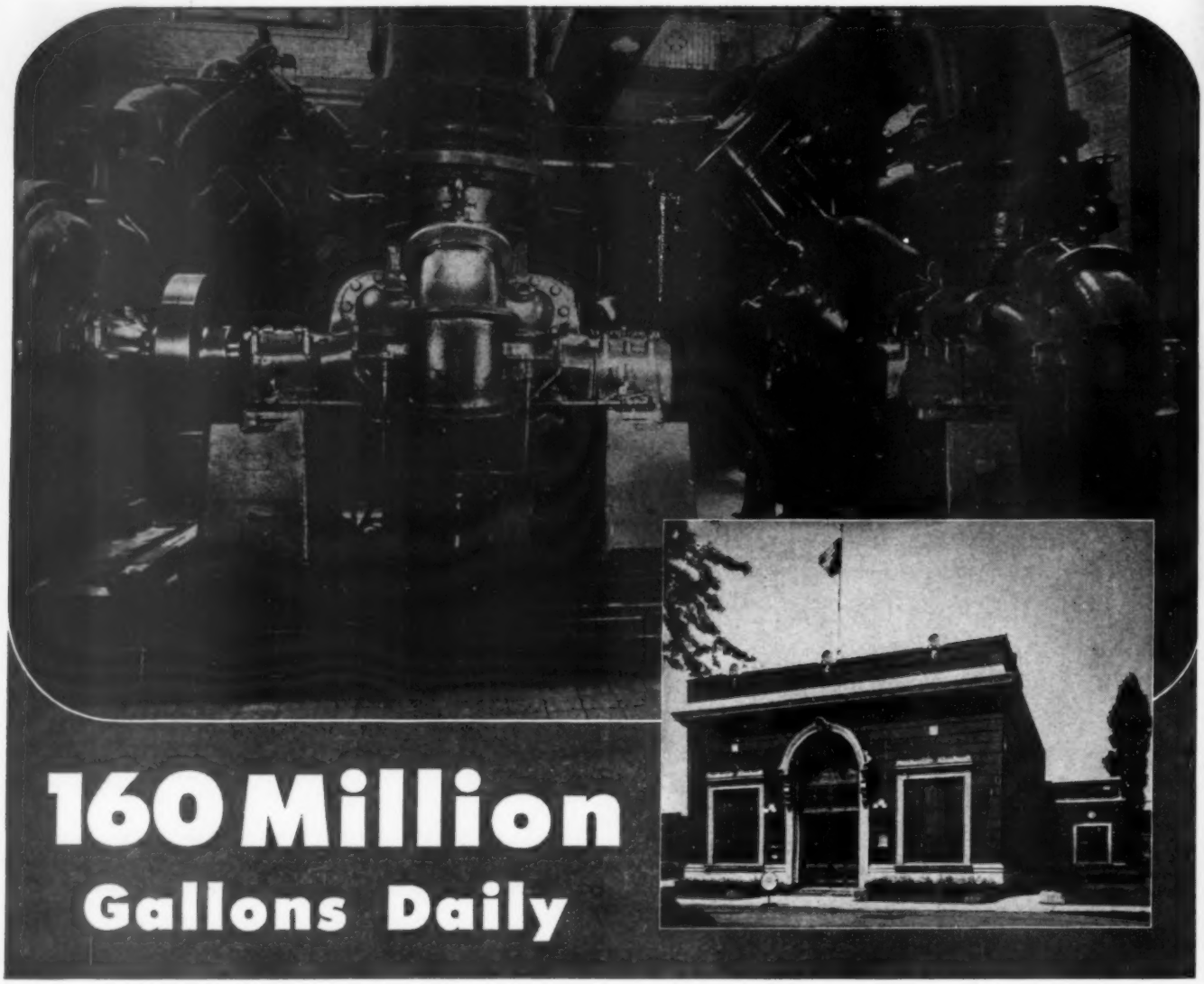
How can we help you? Write Dept. W-1.

FIGHT INFLATION WITH YOUR WAR BOND DOLLARS

HOOKER ELECTROCHEMICAL COMPANY
NIAGARA FALLS, N. Y.
NEW YORK, N. Y. • TACOMA, WASH. • WILMINGTON, CALIF.

ARMY E NAVY
HOOKER ELECTRO CHEMICAL COMPANY

HOOKER CHEMICALS



Thomas Jefferson Pumping Station
uses four Fairbanks-Morse thirty-inch, double-suction pumps

A group of four Fairbanks-Morse thirty-inch, double-suction, single-stage, split-case pumps gives the Thomas Jefferson Pumping Station in Chicago a total capacity of 160,000,000 gallons of water daily. Installation of these pumps departs from the conventional in that suction is horizontal and discharge is vertical. Water is taken from Lake Michigan at the Wilson Avenue Crib, brought through five miles of tunnel and discharged through twenty-three miles of feeder mains. Each of these big pumps is driven by a 1200 hp. motor.

Modern pumping equipment such as is found at the Thomas Jefferson Pumping Station, saves the taxpayers of any municipality real money. In many cases, old pumps, even if as good as when installed, exact at least a 10% power cost penalty. At that rate, new pumps soon pay for themselves.

Comparatively few cities require pumps with such large capacity as Chicago; but large or small, Fairbanks-Morse builds the right pump for the job.

Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago, Illinois.

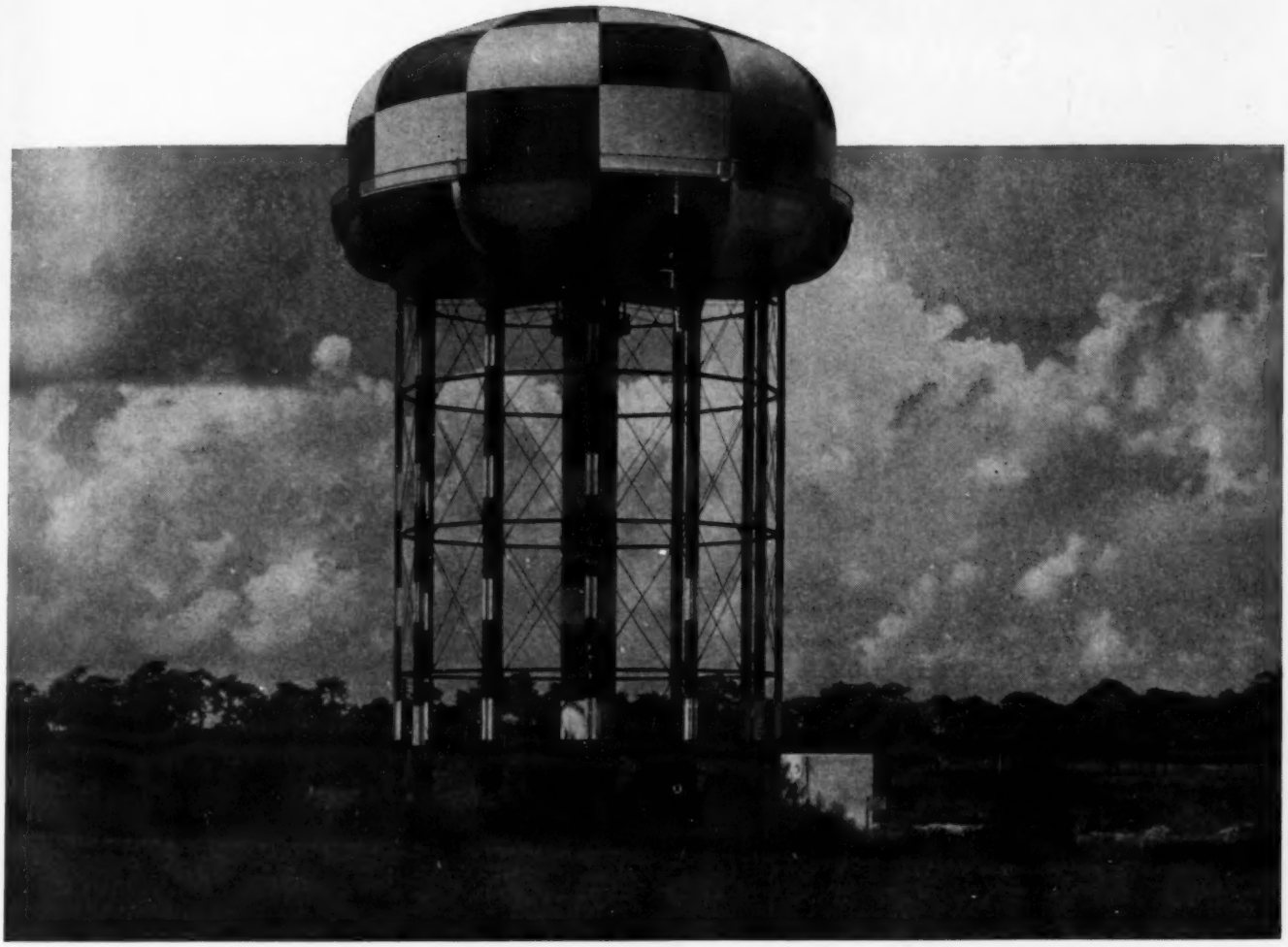
BUY WAR BONDS

FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS
WATER SYSTEMS
SCALES
STOKERS
FARM EQUIPMENT
RAILROAD EQUIPMENT

Pumps

New 1,500,000-gal. Horton Tank
for Tampa, Florida



In addition to this new 1,500,000-gal. radial-cone bottom tank, Tampa, Florida's waterworks distribution system includes three 500,000-gal. Horton elevated tanks, a 3,500,000-gal. concrete reservoir and a 100,000-gal. elevated tank at Port Tampa City.

FACED with the responsibility of supplying adequate water to approximately 171,000 residents, many vital war industries and military camps, the city of Tampa, Florida, recently erected a 1,500,000-gal. Horton elevated tank to take out the peak fluctuations in a certain area. Because of the demands on the water system brought about by the needs of war, pressures in this section at times of peak loads were extremely low. The new elevated tank was recommended to relieve this acute condition.

The benefits which the residents of Tampa have secured from its Horton elevated tanks are the reasons why many municipalities have learned to depend on this type of storage to meet the water demands in times of emergencies.

Other benefits provided by elevated storage are: (1) Provision for pumping during off-peak periods, (2) adequate reserve in case of power failure, and (3) maintenance of an ample reserve for fire protection.

CHICAGO BRIDGE & IRON COMPANY

Chicago 4.....2198 McCormick Bldg.
New York 6.....3390-165 Broadway Bldg.
Cleveland 15.....2262 Guildhall Bldg.
Havana.....402 Edificio Abreu
Birmingham 1.....1586 North 50th Street

Tulsa 3.....1646 Hunt Bldg.
Houston 1.....5615 Clinton Drive
Philadelphia 3.....1644-1700 Walnut St.
Washington 5.....330 Bowen Bldg.
San Francisco 5.....1083 Rialto Bldg.

For Sewer Engineers WHO ARE LOOKING AHEAD

Future-thinking engineers will be interested in this airport drainage story: To provide a stream enclosure over which a new runway could be constructed, 1570 feet of 54-inch pipe was required. Strength and durability were essential. Designers solved the problem with Asbestos-Bonded Paved Pipe.

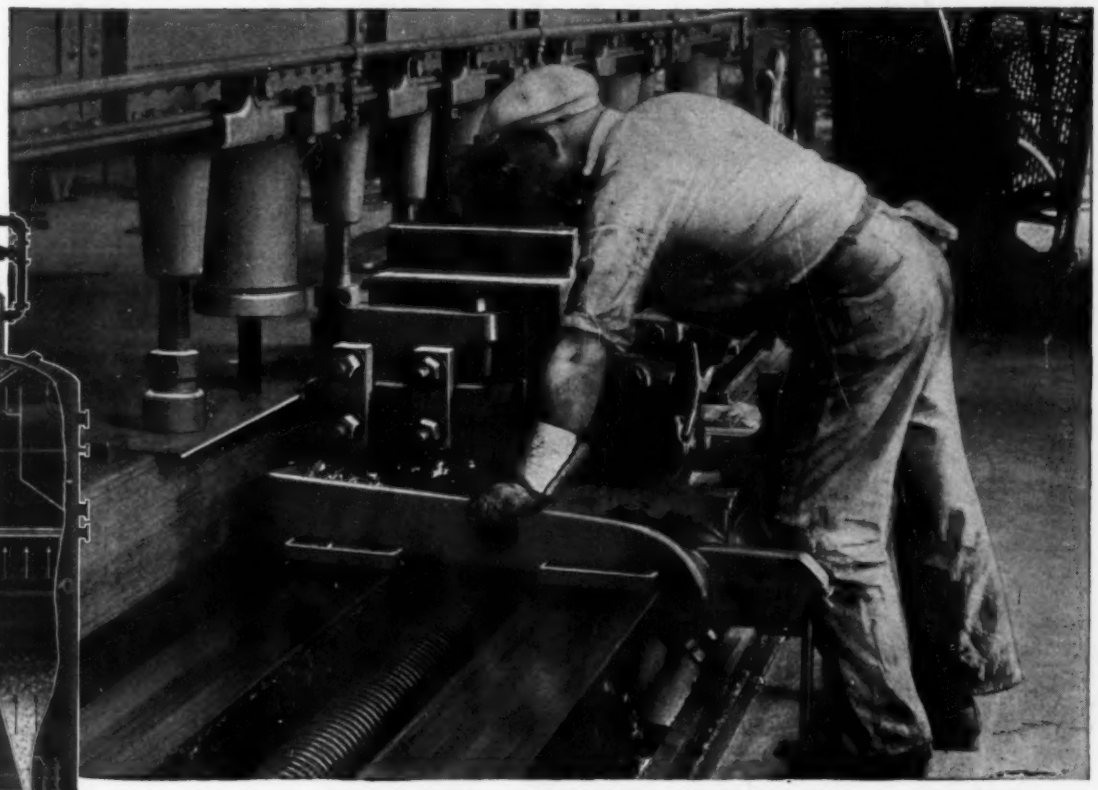
The flexible corrugated metal design of ARMCO Pipe prevents breakage; and band couplers make for strong, tight joints. Longer lengths and fewer joints mean lower installation costs. Cradling is unnecessary. Corrosion is shackled by a full bituminous coating tightly bonded to the base metal. A thick bituminous pavement checks erosion—makes the bottom last as long as the top.

It will pay you well to keep Asbestos-Bonded ARMCO Sewer Pipe in mind for post-war projects even though you may not be able to get it for immediate construction. After the war it again will be available to help solve your toughest sewer problems. Armco Drainage Products Association, 15 Curtis Street, Middletown, Ohio.

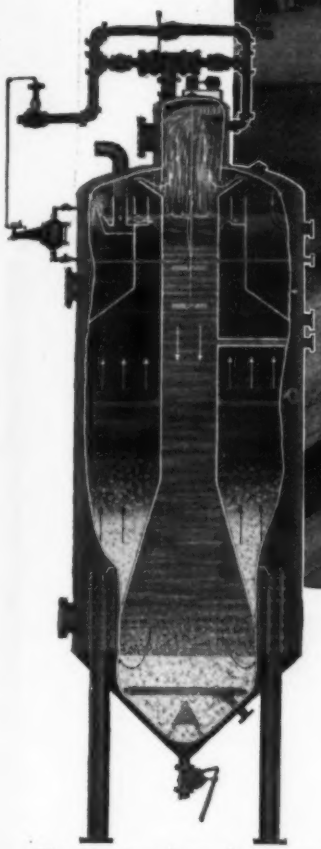
ARMCO

ASBESTOS-BONDED
ARMCO SEWER PIPE

WE'RE *helping to keep hundreds of plants rolling!*



Planing a steel plate in preparation for welding



The drawing above shows a cross-section view of the Graver Hot Process Water Softener with Deaerating Equipment. Like all Graver Water Conditioning Equipment, it can be built in any size to meet your specific requirements.

THE STEAM generating plant is the heart of the community and it must be kept at peak efficiency without interruption. Time out for boiler tube cleaning or repairs means a drop in available power, to say nothing of the resultant delays and expense.

In hundreds of municipalities, Graver Hot Process Water Conditioning Equipment is preventing such interruption by supplying properly conditioned boiler feed water to the steam generating plant. This equipment softens raw water make-up and deaerates make-up water and condensate returns. It reduces hardness, thus eliminating scale-forming solids, and prevents corrosion by eliminating free carbon dioxide. It is power insurance . . . as essential to postwar progress as it is to today's war effort.

Whether yours is a need for today or merely a plan for the future, consult Graver . . . now. Our engineers will gladly discuss your problems with you and submit recommendations and estimates without obligation.

GRAVER

WATER CONDITIONING EQUIPMENT

43-50-W

Water Conditioning Division of

GRAVER TANK & MFG. CO., INC.

4809-39 Tod Ave., East Chicago, Ind.

NEW YORK CATASAUQUA, PA. CHICAGO TULSA

Hot Process Water Softeners • Zeolite Water Softeners • Water Filters
Oil Removal Filters • Taste and Odor Removal Filters • Chemical Proportioning Equipment • Filtering Material • Reactivators

EXPERIENCE ...picks Sodium Silicate WATER TREATMENT

FOR

★ BETTER QUALITY OF WATER
★ HIGHER FILTRATION RATE
★ LOWER COSTS

ALKALI

Use.... STANDARD SILICATE

for
- UNIFORMITY
- DEPENDABILITY
- IMPROVED FLOCCULATION

Write for information on the best way to use the Silicate Treatment in your plant. Use the coupon.

Standard Silicate Division, Diamond Alkali Company,
Oliver Building, Pittsburgh, Pa.

Our water supply has the following characteristics:

. . . . . Million Gallons per Day Average Turbidity .....

Present Dosage . . gr./gal. Coagulant . ...

We would be glad to receive further information on the use of Standard Silicate.

Name . . ..*Title*..... . .....

Water Works. .. . . *City* . .. .. *State*.....

DIAMOND ALKALI COMPANY • Standard Silicate Division

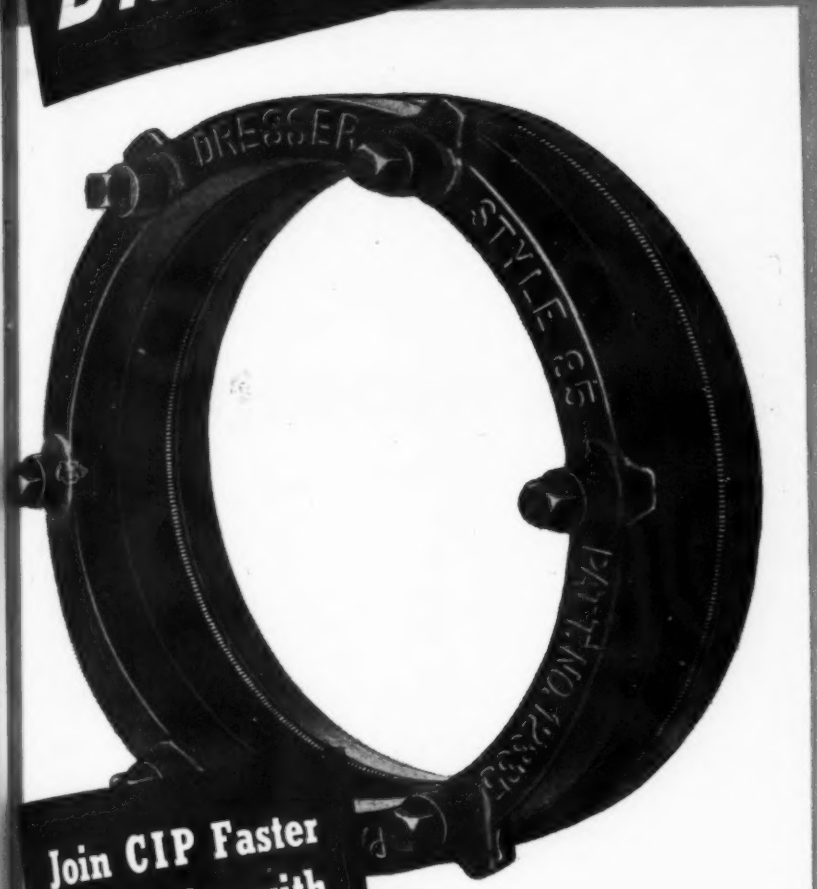
Plants at CINCINNATI . JERSEY CITY
LOCKPORT, N. Y. . MARSEILLES, ILL.
DALLAS, TEXAS

General Offices • PITTSBURGH, PA.

Again you can get Cast-Iron Pipe

FOR THE

DRESSER BELLMASTER JOINT



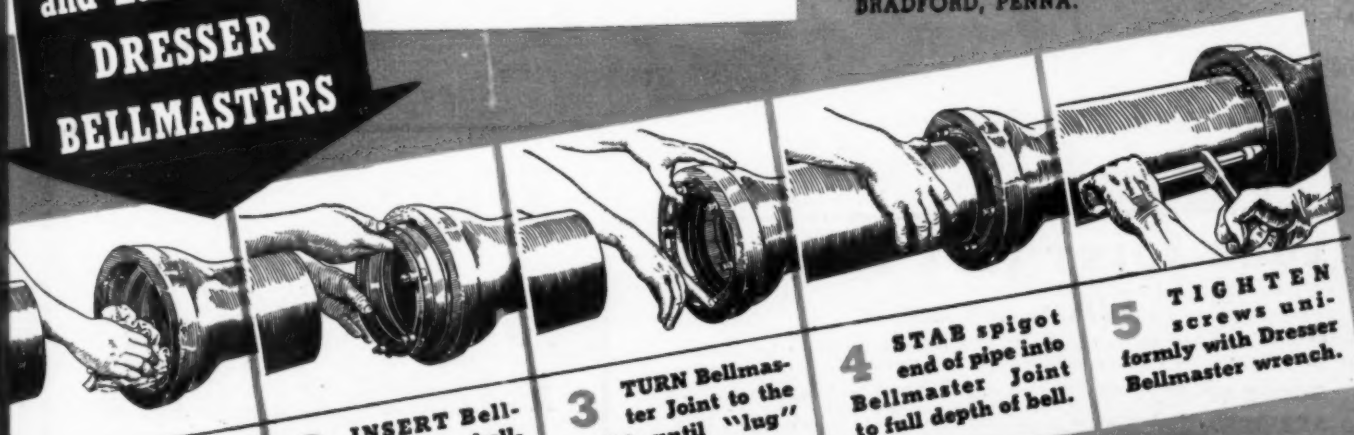
Remember in 1941 when the new Dresser Bellmaster Joint—Style 85—was first introduced? Superintendents and maintenance men saw at a glance that here was a faster, better way to join cast-iron pipe. Hundreds sent for a sample joint. Subsequent installation proved its superiority.

Then came the War and cast-iron pipe manufacturers, doing an urgent War job, were unable to change over and expand facilities to furnish the special pipe needed for the Bellmaster. Today, the situation has improved. Makers are now able to deliver Bellmaster pipe. And we are ready to ship these new Dresser mechanical joints promptly in 4", 6", 8", 12" and 16" CIP sizes (about one month for 10" size).

Almost ten million men are at War and manpower is at a premium. This is the opportune time to standardize on the fastest cast-iron pipe joint on the market. It comes in one piece, easy to handle, easy to store. Light, tight, strong, flexible, it offers unfailing service and pipe-line protection to cast-iron pipe users. Investigate the Dresser Bellmaster. Catalog on request.

Dresser Manufacturing Company
Affiliated with Dresser Industries
BRADFORD, PENNA.

Join CIP Faster and Easier with DRESSER BELLMASTERS



1 WIPE out spigot end of pipe and inside surface of bell in the usual way.

2 INSERT Bellmaster in bell-end of pipe with cap-screws facing out.

3 TURN Bellmaster Joint to the right until "lug" hits stop in bell.

4 STAB spigot end of pipe into Bellmaster Joint to full depth of bell.

5 TIGHTEN screws uniformly with Dresser Bellmaster wrench.

TODAY....

and TOMORROW

● Now's the time to make plans for your pipelines of tomorrow . . . and to get down in black and white all those war-deferred municipal improvements and extensions which can be started immediately after the war.

In planning water supply lines, it's the duty of every responsible official to build the sturdiest pressure lines possible. And, the one sure way to do that is to specify Lock Joint Reinforced Concrete Pressure Pipe. For many years, Lock Joint Pipe has been checked and double-checked, proven again and again, even under the most difficult conditions, a safe and sound investment. When installing Reinforced Concrete Pressure Pipelines, here's the performance you can depend upon: LOW FIRST COST . . . LONG LIFE . . . HIGH CAPACITY . . . LOW MAINTENANCE . . . GREAT STRENGTH . . . WATER TIGHTNESS . . . SAFETY.

The extensive use of Lock Joint Concrete Pressure Pipe for important mains in principal cities throughout the country and the constantly growing number of repeat orders is abundant proof of the quality of these tailor-made pipelines.

◆ ◆ ◆ ◆

Whether your project is large or small, for the present or the future, your 'phone call, telegram, cable or letter to any of our offices will bring a prompt reply.

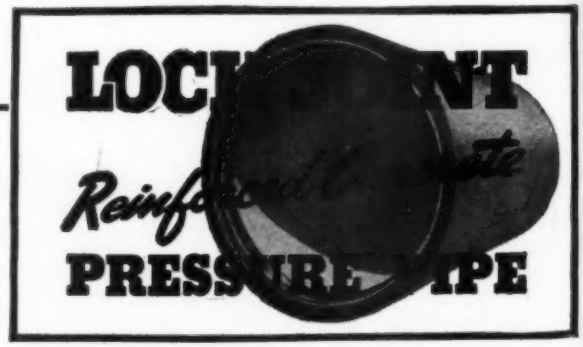
LOCK JOINT PIPE COMPANY

Established 1905

AMPERE, NEW JERSEY

Denver, Colo. • Chicago, Ill. • Kenilworth, N. J. • Kansas City, Mo. • Rock Island, Ill.
Joplin, Mo. • Valley Park, Mo. • Cleveland, Ohio • Hartford, Conn. • Navarre, Ohio

SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply Mains as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous lines.*

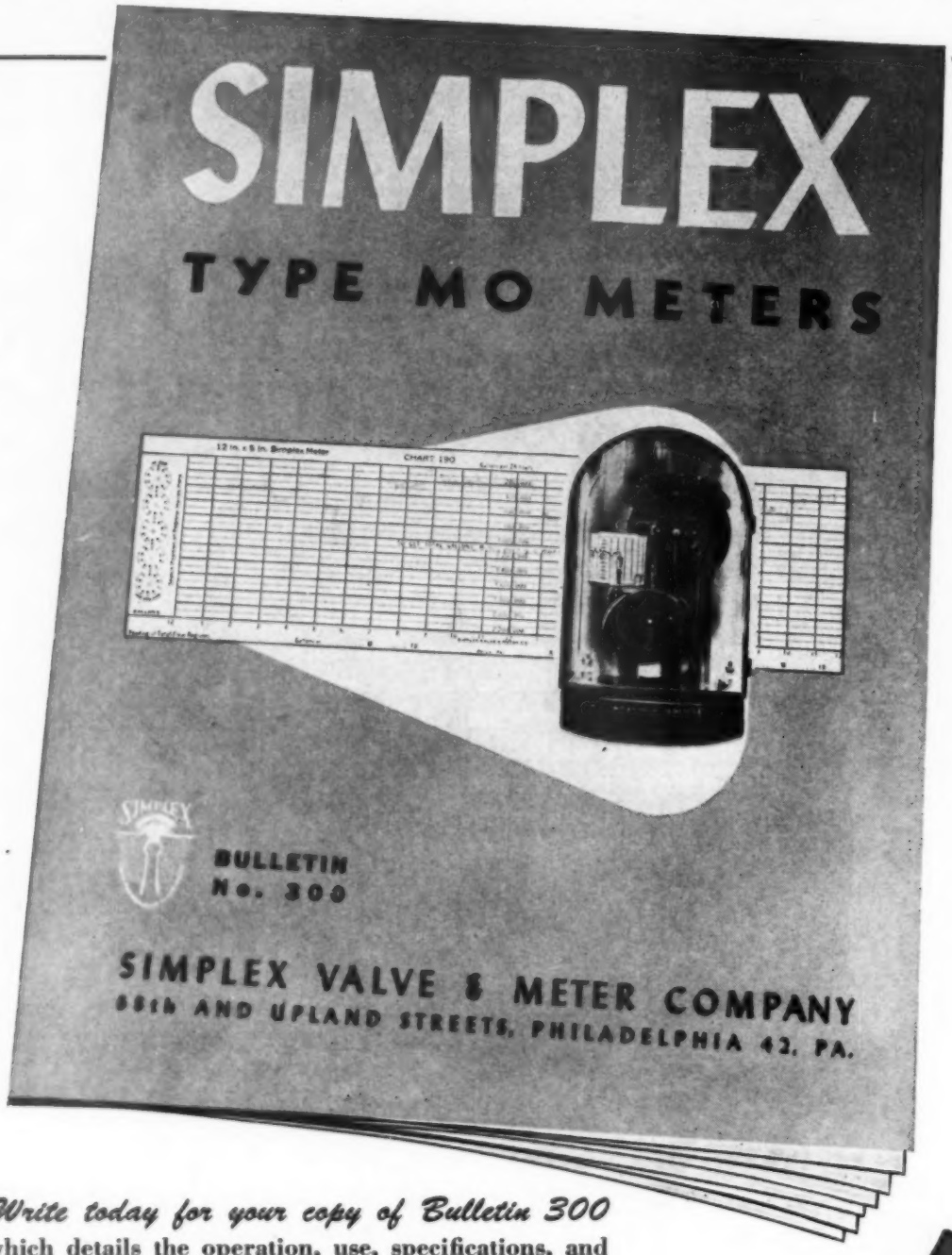


1944
JANUARY 1944
FEBRUARY 1944
MARCH 1944
'44—and the FUTURE
Business accepts as fact, that the future belongs to those who prepare for it. Most of us intend to prepare; the difficulty is, that we fail to convert our intentions into definite action, due perhaps to pressing current problems that take up so many working hours.
If your plans for this year include the consumption of any of our products, we suggest that you convert these plans into commitments at the earliest possible moment so that we can arrange our manufacturing facilities to fulfill your requirements. Here at Industrial Chemical Sales we have worked hard—and long during the past year to produce a goodly supply of our products and we will keep at it just as diligently during 1944.
ACTIVATED NUCHAR CARBON
BLUEPRINT NOW!
But above all remember there is a war yet to be won. Maintain equipment to assure operation at 100% efficiency.
INDUSTRIAL CHEMICAL SALES
DIVISION WEST VIRGINIA PULP & PAPER COMPANY
230 PARK AVENUE NEW YORK 17, N.Y.
35 E. WACKER DRIVE CHICAGO 1, ILLINOIS
748 PUBLIC LEDGER BLDG. PHILADELPHIA 6, PA.
844 LEADER BLDG. CLEVELAND 14, OHIO

HERE ARE ALL THE FACTS ABOUT THE

SIMPLEX TYPE MO METER

The High-Accuracy Flow Rate Meter



Write today for your copy of Bulletin 300 which details the operation, use, specifications, and accuracy of the Simplex MO flow rate meter. Specified by operating men and management from coast to coast.

SIMPLEX VALVE & METER COMPANY

6743 UPLAND STREET, PHILADELPHIA 42, PA.

RING-FREE REMOVES CARBON REDUCES FRICTION, SAVES FUEL!

Don't Deprive *Any* Power Plant Of This Operating Economy!

Carbon trouble is expensive in down-time and repair bills on all sizes and types of Diesel and Gasoline engines. In every engine suffering from carbon, the first crankcase full of Macmillan RING-FREE Motor Oil begins to *remove* the carbon from pistons, rings, valves *while the engine runs.* Continued use of RING-FREE keeps the formation of destructive carbon in check. The result is a cleaner, more thoroughly lubricated, sweeter running engine.

Another, even greater RING-FREE advantage is its ability to reduce friction *fast!* That actually delivers more power to the drive shaft . . . produces measurable fuel savings. It also cuts down wear and repair. Many operators who started by lubricating just one of their engines with RING-FREE were so convinced by the performance and economy obtained that they now order Macmillan RING-FREE for *all* their motorized equipment.

MACMILLAN PETROLEUM CORPORATION

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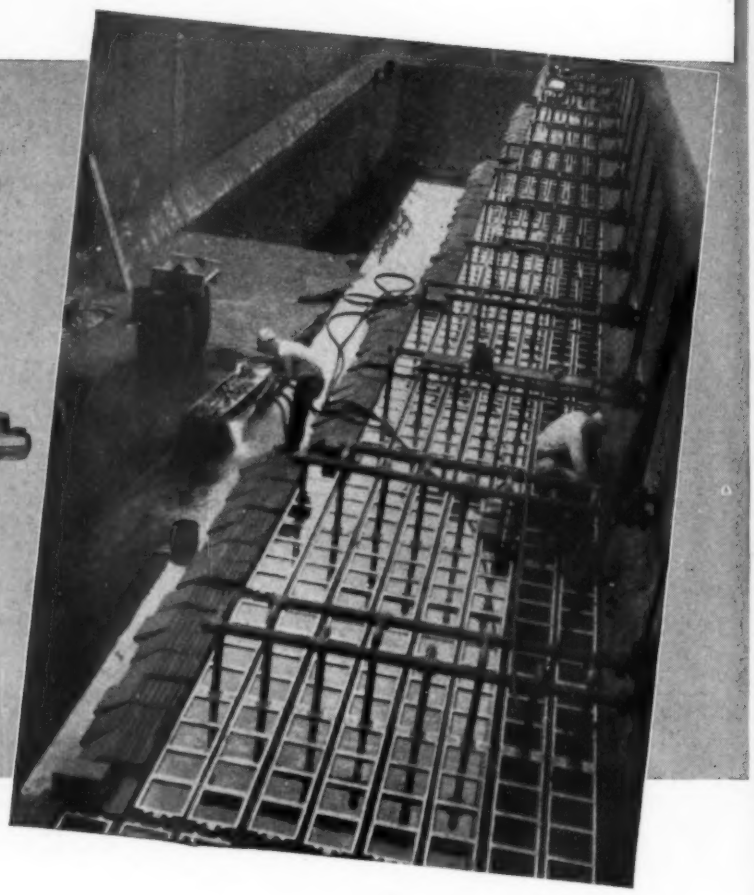
REDUCES WEAR BY REDUCING FRICTION

IN PLANNING NEW TREATMENT PLANTS,

it's well to Remember

Restoring their efficiency is simplified when plates are mounted in Alcoa Aluminum holders.

Alcoa Aluminum diffuser plate holder—prewar model.



"*Among the most troublesome problems of physical maintenance of activated sludge plants is that of clogging and restoration of air diffusers.*"—Quoted from a recent Society report.

Wartime increases in sewage flow and greater concentration of industrial wastes have given treating plant operators many a headache. One of these—clogged diffuser plates—has been eased considerably by Alcoa Aluminum plate holders.

Plates are removed for cleaning simply by loosening the holding-down bolts. Restored plates are bolted against airtight gaskets, and the diffusers are ready to go to work again. Where it's necessary to lift out an entire holder (plates are mounted in gangs) the light weight of aluminum makes this job easier.

Men who are laying out new sewage treatment plants should bear these facts in mind. The use of Alcoa Aluminum diffuser plate holders makes it easier to keep plants working at high efficiencies. Labor is saved and maintenance costs are kept down.

Alcoa engineers will gladly advise you on the types of Alcoa Aluminum diffuser plate holders, and other aluminum treating plant equipment, to be made available to you just as soon as the war permits. Write ALUMINUM COMPANY OF AMERICA, 1955 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA ALCOA ALUMINUM REG. U. S. PAT. OFF. **ALUMINUM**

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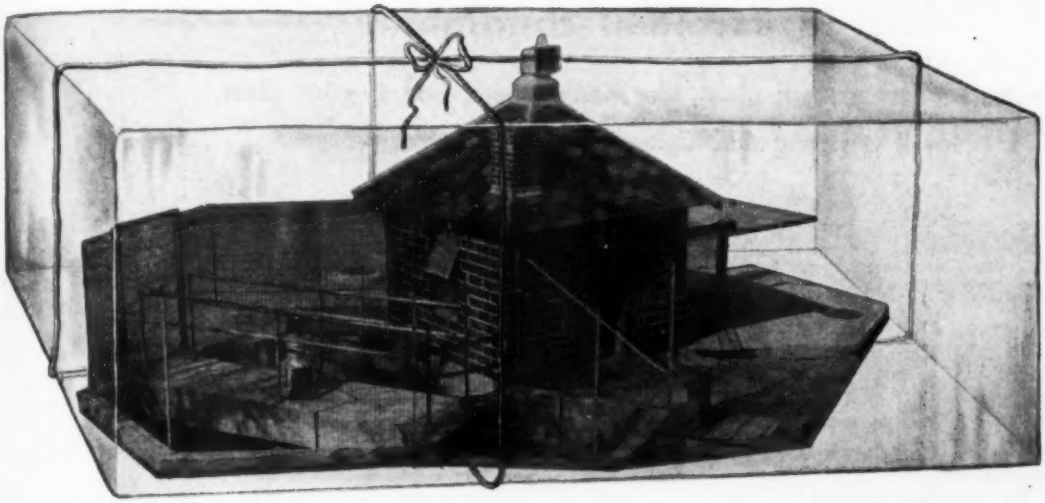

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Operate continuously during subzero weather. Ice cannot form at any point to hinder operation. No extra winter maintenance necessary.

Fig. 2348—"Chicago" Combination Aerator-Clarifier for "Packaged" sewage treatment plants for small communities. Performs the aeration and clarification phases of the Activated Sludge Process in a single tank. Provides for continuous sludge circulation and positive automatic sludge control. Effects sewage purification to 98 per cent removal of contaminating organic matter. Requires only approximately four hours supervision daily by an average individual.

Absence of flies, odors and unsightly nuisances have allowed economical location of plants near dwellings, thus avoiding long sewers required for locating other types of plants far away from residences.

Ask for full description and discussion with actual operating data for this type of plant, which has been specifically developed for the characteristic small community sewage flow and strength.

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SEWAGE EQUIPMENT DIVISION

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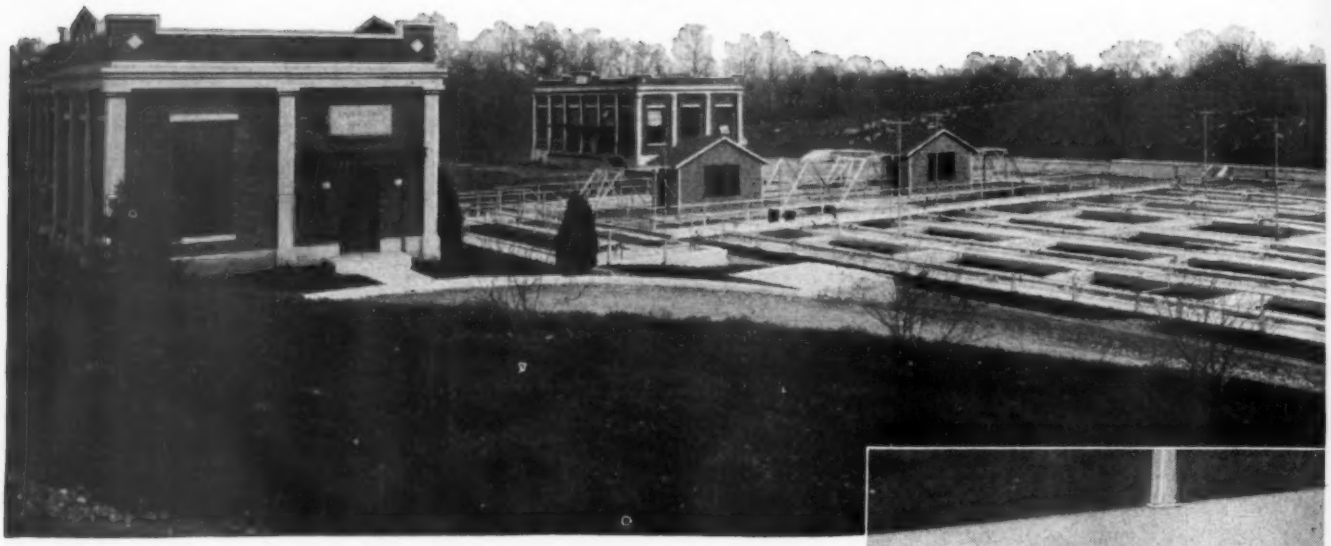
Electric Pumps: Circulating, Bilge, Scru-Peller, Flush-Kleen, Plunger, Fire, House, Condensation, Vacuum.

Swing Diffusers, Stationary Diffusers. Mechanical Aerators, Combination Aerator-Clarifiers, Comminutors.

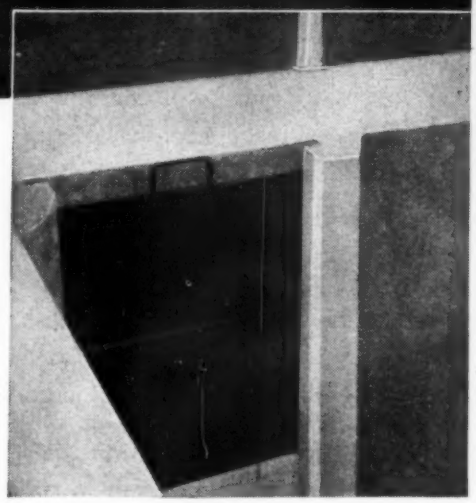
AFTER 11 YEARS SERVICE

Everdur* Gates in Aeration Chambers still in excellent condition

Engineers for Hagerstown plant, like many others, find Everdur ideal, for it is strong and highly resistant to corrosion



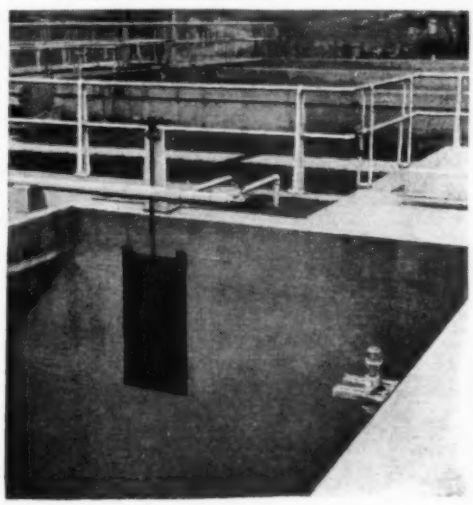
Hagerstown, Md., Sewage Disposal Plant where 14 Everdur gates and one Everdur weir plate have given many years of expense-free service. Fuller & McClintock, N. Y., Consulting Engineers. *J. B. Ferguson & Co., Hagerstown,* Contractors.



Hand-and stem-operated gates at the Hagerstown, Md., Sewage Disposal Plant.

EVERDUR, a copper-silicon alloy, is unusually well adapted to lightweight, wrought, built up structures such as the hand- and stem-operated gates illustrated. It has been selected for a large number of projects because over a period of 16 years the superiority of the alloy has been demonstrated under a wide variety of operating conditions.

EVERDUR is rustproof and highly resistant to corrosion, possesses great strength and can be fabricated economically by all common methods. What's more, this valuable alloy is moderate in cost. A more complete explanation of its wide use, not only for gates but also screens, effluent and scum weirs, etc., will be found in Anaconda Publication E-11. Write for a copy—there's no obligation. 4013SC



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*EVERDUR is a trade-mark of The American Brass Co., registered in the United States Pat. Off.

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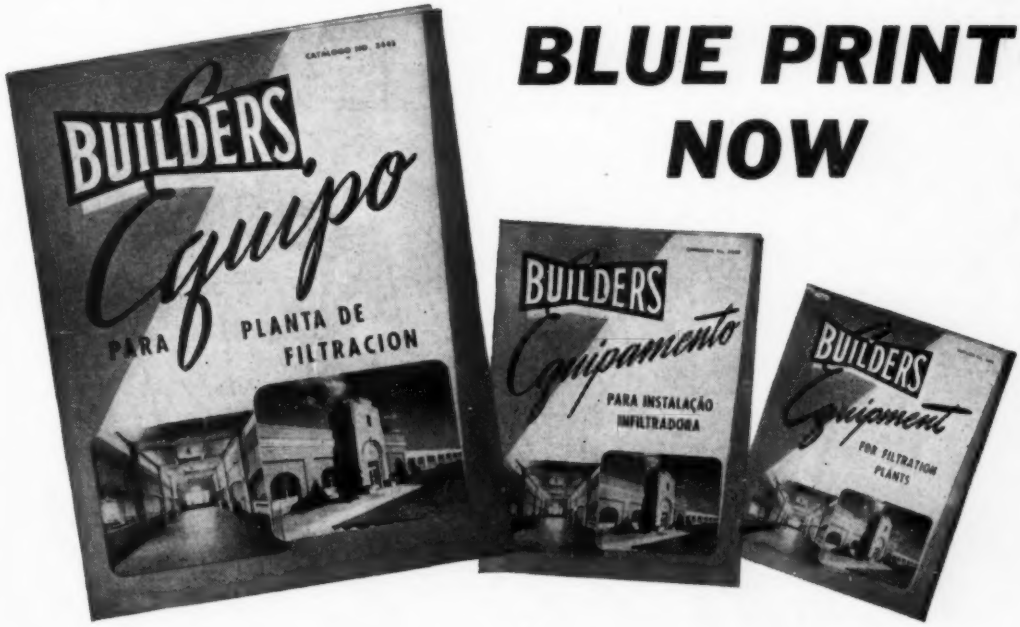

Just off the press, in English (344E), Spanish (344S), and Portuguese (344P), this bulletin shows Builders Filtration Plant equipment for metering and controlling flow and liquid level, and for sand expansion. Diagrammatic installation drawings . . . photographs of equipment . . . simple, concise explanations. Send for this and other helpful bulletins on specific equipment. Our long experience is at your service. Builders-Providence, Inc. (Division of Builders Iron Foundry), 9 Codding St., Providence 1, R. I.

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WATER AND SEWAGE WORKS
Equipment

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Filter Gauges
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Sincerely Yours,

BUILDERS-PROVIDENCE

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By the fireside, in the quiet of your home, discuss improvements and extensions to your water works system. When your plans include expansion you will need new Hypochlorinators and Chemical Feeders. The recently announced %Proportioneers% Heavy Duty Chem-O-Feeder is being widely discussed in postwar planning. For the past ten years %Proportioneers, Inc.% has been intimately associated with water works engineers and operators and our equipment has been designed to meet the requirements of these men in feeding the great variety of chemicals needed in modern water treatment.

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WATER WORKS & SEWERAGE

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EDITORIAL OFFICE
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COMING!

"Developments of the Year in Sewerage"

Featured in our February issue will be the annual review of developments and trends in the field of sewerage and the treatment of sewages and industrial wastes. The reviewer is one in whom we take a deal of pride. Long time Editorial Associate of WATER WORKS AND SEWERAGE and now prominent in the affairs of the American Society of Civil Engineers, Chief of the Sewerage Division of the W.P.B., and President of the Federation of Sewage Works Association—this distinguished reviewer is—

A. M. RAWN,
Chief Engr. and Gen'l Mgr.,
Sanitation Districts of Los Angeles County.

"The Advantages from Waterworks and Sewerage Under One Management"

Are related by one who has now had several years of experience as head of the sewerage system as well as the water supply system of a thriving small city. In as much as the general trend is in the direction of combined operation and management of these two closely allied public utilities, this article will serve to clarify the minds of those who contemplate the coming of joint operation of these two utilities in their home community. The enthusiastic author is—

JOHN W. PRAY,
Manager of Utilities, Fort Dodge, Ia.

"A System of Planned Maintenance"

Like many another water supply practice that is progressively out in front in the operation of the St. Louis County Water Co., the system of "Planned Maintenance" which has proved its worth to this efficiently operated and maintained water utility is to be described by—

VANCE C. LISCHER and
HERBERT O. HARTUNG,
Production Engr. and Sanitary Engineer,
St. Louis County (Mo.) Water Co.

"Solving the Problem of Oil in Sewage"

Is the story of the problem which many an operator has had with oil in sewage. This up-and-coming plant superintendent tells of his experiences and what has been done to solve the problem and lick this nuisance. He is—

JOHN McDONALD,
Supt. of Treatment Works, Springfield, Mass.

"Build Your Own"

Is the suggestive caption of an article describing how one operator has made the best of the present materials and equipment situation by "building his own" in the local water and sewage plants—in other words gadgets for easier or improved plant operation. This "gadgeteer" is—

BARTLEY CASH,
Ass't Supt., Dept. Water and Sewerage,
Newnan, Ga.

"Maintenance of Water Wells"

Is the story of a man of long and wide experience in the development and maintenance of drilled wells. While some of the article may not be news to those who have for sometime been operating ground water supplies, some will be new. To those who are less experienced in deep well maintenance this article will mean much for future reference when yields drop off or other troubles develop. The author is—

N. E. GUNDERSON,
President, Lane-Northern Co., Mishawaka, Ind.

"What to Tell the Complaining Customer"

If you are sure you know all there is to tell the complaining customer of the water utility then you needn't read this article. If not, there's something worth while for you in the reasoning of—

WM. T. BAILEY,
Supt. of Water, Kansas City, Mo.

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will result from almost any investment in *meter maintenance*"

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Meter Repair Foreman
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Indian Hill Tank, Cincinnati, Ohio

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WATER WORKS & SEWERAGE

VOL. 91, No. 1 *A Gillette Publication* JANUARY, 1944

DEVELOPMENTS OF THE YEAR IN WATER SUPPLY

By SAMUEL B. MORRIS*
Dean, School of Engineering
STANFORD UNIVERSITY

The Author

THE war goes on. New plant construction is slowing down and production of war goods continues to advance. On the many fronts in this global war the United States and its allies are making progress. Victory seems certain but the time is equally uncertain. Like college football coaches our war leaders are speaking with optimism and cautioning the public against overconfidence. Everywhere people are talking of planning the peace and planning for the postwar.

Into this scene the water works man continues to do more and more with less and less. Inroads on his manpower are becoming more serious. Lack of expenditure of manpower and materials on adequate maintenance of water works is now being recognized and Washington has cautioned management to do what is necessary to provide adequately for water—a critical war process material.

WPB-AWWA Water Conservation Campaign

On July 6, WPB decided to initiate and sponsor a conservation program for voluntary conservation of coal, petroleum products, transportation, gas, electricity, water and communication to be undertaken by the government in cooperation with the industries concerned. Accordingly on July 28, the Office of War Utilities, in consultation with the Committee on Wartime Waterworks Practice of AWWA, developed a comprehensive program to achieve the objectives of the War Production Board within the water industry and issued a pamphlet entitled "Report on Voluntary Conservation Program for Water Utilities."

This program is directed toward waste reduction at all seasons and to reduction of peak loads. Mr. H. Lloyd Nelson of the Water Supply Division of O.W.U. attended practically all AWWA section meetings in behalf of the water conservation program.

Recognizing the desirability of supporting the conservation program as strongly as possible and the further fact that, unlike other utility groups, water works have not been so closely united in matters of public policy and practice as to have a going publicity plan the AWWA has prepared a 100 page booklet entitled "Water Conservation" which was mailed in October to all water works in communities of 10,000 population or above. This booklet contains a new copyrighted character, "Willing Water," as an animated water drop created by Gene Carr from the ideas of Harry Jordan. Copies of this excellent booklet are available by writing AWWA and all materials may be freely copied for local conservation campaigns. First copies of the booklet are $2.00, additional copies $1.00 each.

Water Conservation for a Modern Steel Mill Prevents Waste[1]

Henry J. Kaiser's Fontana steel plant, the first complete iron, steel, and coke plant on the Pacific Coast, has a notable water plant that permits no waste water to flow off the plant property. Located 50 miles east of

(1) 1943—Civil Engineering—p. 579.

WILLING WATER SAYS
THIS IS A LEAKY FAUCET
IT WASTES 970 GALLONS OF WATER A DAY
IT NEEDS THIS NEW WASHER
SAYS WILLING WATER
AND THIS IS THE WRENCH
TO FIX THE LEAKY FAUCET
COME ON FOLKS LETS STOP ALL LEAKS TO HELP WIN THE WAR
STOP WATER WASTE
AWWA
Utility Name and Address

AWWA's "Willing Water".

*President of AWWA.

Los Angeles adjacent to no river, lake or other surface water, it was found necessary to both conserve water and eliminate any waste which might contaminate ground water—a far cry from many existing stream polluting plants.

Taylor and Taylor, Consulting Engineers of Los Angeles, designed the water treatment system. Water supply is obtained from the Fontana Union Water Company having surface and ground water supplies. Standby water is available on the mill property from deep well turbine equipped wells. The Colorado River Aqueduct of the Metropolitan Water District traverses the site and offers reserve capacity should there be an expansion of the steel plant.

The relatively good quality incoming water is all given lime treatment followed by recarbonization and rapid sand filtration. After this initial treatment of the total supply, separate systems are provided for industrial use and domestic use including feed water.

The total flow of water in circulation for industrial and domestic uses is 47,000 gal. per min., or roughly 14 times the combined makeup of 2,200 gal. per min. for industrial supply and 1,100 gal. per min. for domestic and boiler feed water. Of the latter 300 gal. per min. are salvaged after passing through the two stage, recirculating, biofiltration plant.

Natural sedimentation removes 80 to 95 per cent of the suspended solids in the slurry from the blast-furnace gas washers and electric precipitators with continuous sludge wiping and removal in a standard 90 ft. diameter Dorr thickener. The natural reduction from 500 to 1,500 ppm solids to 100 to 170 ppm can be further reduced to 30 ppm by the addition of 1½ grains per gal. of ferric chloride. Loss of water in sludge and by evaporation is 3 per cent.

Cooling water from the rolling mill carries quantities of mill scale to scale pits but finer colloids, and oils are carried to chemical coagulation with oil skimming and continuous sludge wiping and withdrawal through a clariflocculator.

A pickle-liquor treatment plant is provided for liquor from the acid pickling process of the merchant and structural mills and the alloy finishing department. Treatment consists of neutralization of the excess acid by powdered limestone and reaction of soluble ferrous sulfate with the same material, air being forced through the slurry.

The coke-oven gas, ascending in a tower, is met by a spray of a solution of sodium carbonate. The resulting solution of a sodium thiosulfate is pumped into a large quantity of water used in quenching coke. Any waste water from quenching is re-used.[1]

Deferment of Essential Water Works Employees

On January 20, 1943, General Hershey, Director of Selective Service, issued Selective Service Bulletin No. 9, reading in part as follows:

"1. The War Manpower Commission has certified that heating, power, water supply and illuminating services are activities essential to the war effort."

This bulletin was accompanied by a "list of essential activities, which require six months or more of training and preparation" totaling some three dozen occupations applying to water works.

"4. In classifying registrants employed in these activities, consideration should be given to the following:

"(a) The training, qualification or skill required for the proper discharge of the duties involved in his occupation;

"(b) The training, qualification, or skill of the registrant to engage in his occupation; and

"(c) The availability of persons with his qualifications or skill, or who can be trained to his qualifications, to replace the registrant and the time in which such replacement can be made."

The list of occupations includes engineers, chemists, bacteriologists, accountants, filter plant operators, superintendents and a substantial number of skilled trades.

Management may ask for deferment of its employees in essential occupations with or without the consent of the employee.

War Production Board Simplifies Procedures

WPB issued Limitation Order L-252 dated January 23, 1943, and general Limitation Order L-39, January 20, 1943, respectively applying to valves and fire protective equipment including fire hydrants. Accordingly AWWA-NEWWA issued revisions to their standard specifications for Gate Valves and Fire Hydrants embodying the changes required by these limitation orders which were designed to save copper and bronze.

On February 24, 1943, WPB issued its limitation Order No. V-1 replacing the old P-46 Order. The V-1 Order, amongst other limitations, provided that inventory limits for materials in the transmission and distribution class could not exceed four-thirds of the dollar value of items of materials of the same class withdrawn from inventory for use in maintenance, repair, and as operating supplies during the last nine months of 1942. In any one quarter not more than one-third of said nine months withdrawals were to be made.

As water works operators had drastically reduced their withdrawals during 1942 Order V-1 was generally regarded as far too drastic. Many protests were made to WPB, including resolutions passed by several sections of AWWA.

Under date of May 31, 1943, Order V-1 was amended insofar as water utilities were concerned. Under the amendment the limits previously established under Preference Rating Order P-46 of October 10, 1942, for inventories and withdrawals were re-established. Withdrawals were set at 60 per cent of the aggregate dollar value of withdrawals of items of material in the same class during the corresponding calendar quarterly period of 1940. Inventories were similarly set at 60 per cent of 1940 inventories.

WPB recognized the fact that water works management had been over-zealous in conserving materials and on June 23, 1943, J. A. Krug, Director, Office of War Utilities, urged the managers to promptly acquire necessary materials to keep the plants in good condition in support of the war effort.

The Copper Tubing Hiatus

WPB estimates there are 1,250 tons of copper tubing frozen in the hands of the water utilities which are being permitted to use 30-inch goosenecks for repairs and replacements only. On August 11, 1943, the board announced a plan for purchase, remelting and reprocessing such copper tubing. No action has yet been taken on such recapture by the United States and the utilities have been urging WPB to permit the use of copper goosenecks on new service piping where they have the fittings available.

Effective September 24, Order V-1 was again amended and supplementary Utilities Order V-1-f made effective September 30, 1943. These orders eased some

[1] 1943—Civil Engineering—p. 579.

of the restrictions and gave some clarification to the Orders.

WPB Establishes Six Regional Offices

On October 20, 1943, WPB took further steps to perfect its operations by the establishment of six regional offices. The regional engineers in charge of these offices will cooperate with water utilities in maintaining supply and service during the war and assist in developing necessary projects. They will prepare quarterly recommendations to the WPB Requirements Committee for allocation as to materials and equipment.

On October 30, WPB issued Order V-1-h and redrafted Order L-41 on November 1, 1943, in order to further reduce wartime restrictions on construction work particularly regarding service and main extensions and in order to simplify procedures.

WPB Water Division Reorganized Under Gorman

The most recent change by WPB has been to reorganize the Water Division under Arthur E. Gorman, Director. On October 26, 1943, its activities were divided into two sections—Water Supply, and Materials Distribution Sections. The former will program the use of existing water facilities and interconnection of systems and will recommend appropriate steps to provide adequate supplies and facilities with minimum expenditure of critical materials.

The Materials Distribution Section will analyze and recommend priority actions, process CMP forms, cooperate with the Equipment Production Branch of OWU and maintain necessary contacts with other Industry Divisions and with manufacturers.

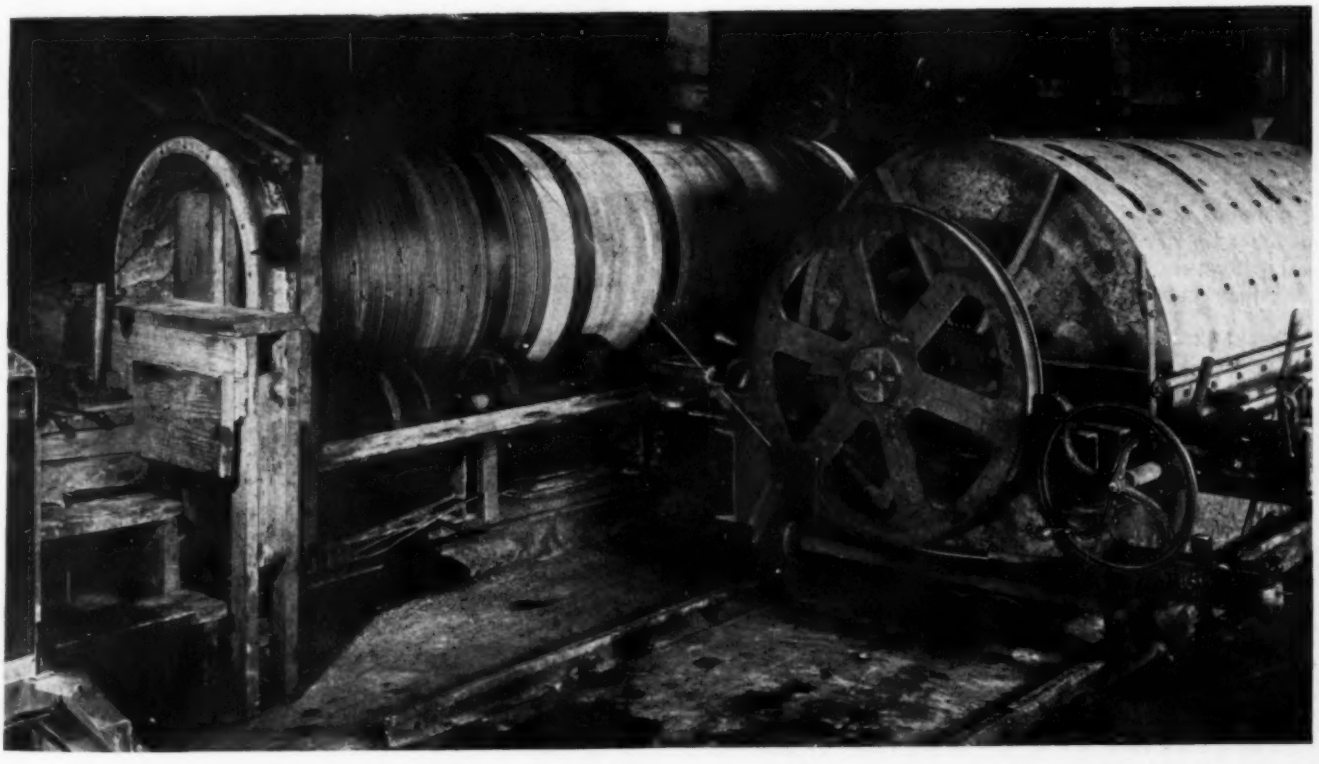
Committee on Water and Sewage Works Development

Under the slogan "Blue print Now" the Committee on Water and Sewage Works Development is fostering immediate postwar plans ready for contract the day victory comes. Dr. Abel Wolman is chairman, and Harry Jordan, secretary, of this committee, which has two representatives each from, and under the sponsorship of, the American Water Works Association, the New England Water Works Association, the Federation of Sewage Works Associations, and the Water and Sewage Works Manufacturers Association. The committee had its first meeting at Washington on July 16, 1943, and entered immediately upon a plan for carrying its message throughout the cities of North America. It adopted this broad premise—

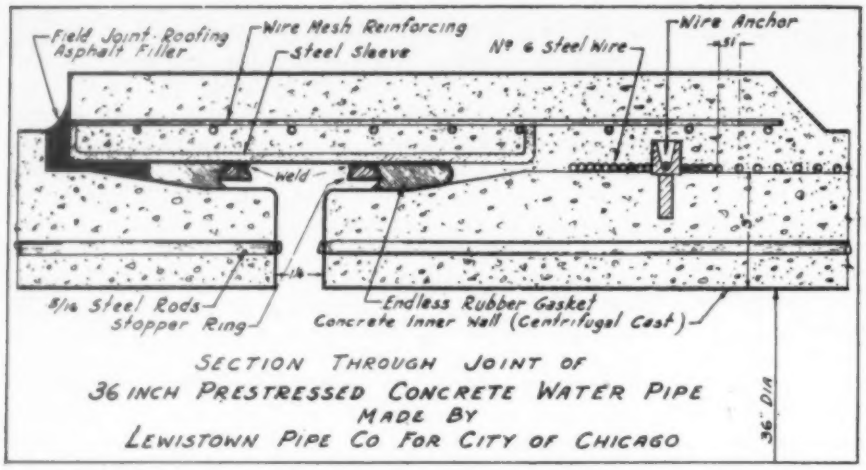
"Every city in North America is entitled to have, and with good management is able to pay for an adequate, safe and satisfactory water supply — and as a good neighbor to other cities, likewise, with good management is able to dispose of its wastes in a manner that offends neither its own citizens nor its neighbor's citizens."

The Committee secured the services of E. L. Filby of Kansas City, Missouri, who was given a leave of absence by the firm of Black and Veatch to act as Field Director. Mr. Filby is contacting state, regional and local groups having an interest in water and sewage works planning. The Committee plans to stimulate the following activities in the cities of North America.

1. An appraisal of the needs for water and sewage works improvement or construction.
2. The development of orderly programs for meeting these needs in the order related to their value to the city or the region.
3. The preparation of detailed plans and specifications for the needs of first importance as soon as arrangements can be made.
4. Consideration of, and development of methods for funding the necessary construction.



Ingenious Wire Wrapping Machine for Pre-stressed Concrete Pipe, Which Produces the Pre-determined Stress by Adjustment of Sand Ballast Load in the Wire Feeding Drum



Detailed Sketch of Joint Assembly of Two Pre-stressed Concrete Pipes

5. Reappraisal of authority under which the contemplated projects can be carried on as well as the legal basis for funding such operations. (Promotion of legislation whenever needed.)

6. Definite scheduling of the construction program. (Immediate purchase of land and rights of way if part of the projects.)

It is interesting to note the universal support for planning for the peace that is to follow victory in this calamitous World War II. The support for such postwar planning seems almost universal but there is much of it that is mere wishful thinking coupled with a prayer that Congress will provide the funds. The Committee asks every community to implement its postwar ideas with actual plans and specifications, and to make and pay for their own plans without looking to or waiting on Washington. Whether it is the growth of the planning idea or the recognition that we failed to plan for the postwar period or the peace that was to follow World War I there can now be no doubt that postwar planning is on the march. Engineering societies, manufacturers' association, chambers of commerce, government—federal, state and local are all in support of such planning.

A handsome brochure, "BLUEPRINT for Tomorrow's Needs NOW," has just been issued by the Committee. After issuing the challenge to those who plan for tomorrow, the brochure includes a 12-point check list for a modern water works and also for a modern sewage system. Every water works man should apply this check list to his own system.

A good example of planning is in the following statement from William Hurlbut of Los Angeles:

"The Los Angeles Department of Water and Power is engaged in developing postwar construction plans for work estimated to cost approximately 16 million dollars. The program consists of much needed but deferred enlargements and construction of new reservoirs and major trunk lines, aqueduct improvements and replacements, and additional terminal storage facilities for the Owens River Aqueduct. Postwar construction is scheduled for a period of six successive years with provisions for accelerating the program if necessary. It is intended to conduct all preliminary surveys, investigations and studies relative to each postwar construction project so that final plans may be prepared with facility. Losses of engineering personnel to the war effort will prevent the complete processing of the postwar construction plans to the blueprint stage. However, it is intended that those projects scheduled for construction in the first or second year of the postwar construction program will be completely planned and ready for immediate construction. Completion of construction plans and specifications for the remainder of the program will provide a backlog of work for the reabsorption of engineering personnel returning from military leaves of absence."

The Cleveland AWWA Wartime Conference

The American Water Works Association held a bang-up Wartime Conference at Cleveland June 15-18, with registration of 1,131. Highlighting this conference were addresses by Colonel Williard Chevalier and President Abel Wolman, whose subjects were, respectively, "The Impact of Postwar Planning on Public Works Programs" and "Planning the Postwar Water Supply Program." Owing to their importance in directing postwar planning, their addresses are summarized here.

Colonel Chevalier emphasized the pent-up purchasing power now being created by war industry and the lack of consumer goods. In his words, "We are doped to the eyes with in-

72-In. Steel Shell Reinforced Concrete Pipe at Detroit, Mich.

flation and the economic doctors are trying to get us to quiet down and stay in bed." But when the war is won, soldiers are coming home, and industry is cutting over to peace-time production of consumer goods, he estimated there would be a critical period of six months to a year. In this period industry and public work must be prepared to go forward with reconversion of plants and construction of public works.

Based upon an assumed national income of 135 billion dollars and with past experience, he estimated 16½ billion for all forms of construction, of which 30 per cent or 5½ billion dollars might be allocated to public construction. With the accumulation of deferred construction during the war period, these large figures, he believes, are within reason. Public work is a service to go with increased production and higher standard of living. He urged the decentralization of postwar public works planning, that plans should be made by all agencies—local, state and federal—with emphasis on local planning. Public works are not synonymous with deficit spending. Legitimate public works provide facilities that are built upon the same basis of creating wealth that private enterprise supports.

Dr. Wolman recounted the fact that expenditures for public water supply from 1920 to 1930 averaged 130 million dollars per year and that the top year of 1930 we spent 200 million. With increased population and delayed maintenance and construction, it does not seem unreasonable to have a program of 220 million per year for the postwar decade. Planning, financing and constructing water works improvements he urged to be done locally. Communities should not wait for congress to act but should assume their own responsibility. He urged making contract plans and specifications now so that construction could begin immediately that the war is won. He urged water departments and water companies not to be bound by municipal boundaries but to comprehend the water supply needs of the entire community or metropolitan area.

Water Works in England Under the Blitz

Mr. Arthur Collins of Westminster, England, representing the British Information Service in America, told AWWA members just what water supply meant to England while taking such violent punishment during the air blitz on London and other English cities. Mr. Collins told of the importance of locating mains so their failure would not endanger subways and other subsurface structures where large numbers might gather, and as an example cited the loss of hundreds of lives when a direct hit was made on the junction of two large water mains near a subway entrance, resulting in flooding the subway where thousands were sleeping nearly 100 feet underground. During all the disruption to water service in Britain there have been no epidemics.

As a result of the blitz experiences, water systems have been redesigned, hydrant hose connections standardized, better hydrant locations made, and most important, a multiplicity of surface storage tanks and basement reservoirs put in service. It is doubtful that much redesign of water distribution to guard against air raids will be undertaken in the United States.

Salvaged Steel Pipe, Concrete Covered, in San Vicente Pipe Line at San Diego River Crossing (Note large number of well points needed)

Erection of Formwork for Chemical Storage Bins, South District Filtration Plant, Chicago, Ill.

Properties of Plastic Water Pipe

Extensive experimental studies of Saran as a service line material were reported by A. A. Kalinske and Dean F. M. Dawson based upon work done by them at the University of Iowa. This vinyl plastic will burn but is self-extinguishing; will resist most alkalies except ammonia; has low thermal conductivity, high coefficient of expansion and changes strength with temperature. Rats will gnaw the pipe. Anyone contemplating the use of Saran will find much useful data in these tests to guide him in the successful use of this new non-metallic pipe.

Tank Painting Specifications Will Void Tank Racket

The AWWA Committee on Steel Standpipes and Elevated Tanks has prepared a pamphlet, "Suggestions for the Preparation of Specifications Covering the Repainting of Elevated Steel Tanks and Water Storage Reservoirs." Copies of this pamphlet should be obtained from the Association by any community contemplating a contract for repainting and/or repair. The experience of Ilmo, Mo., as related by J. Grant Frye, a Girardeau, Mo., attorney, clearly demonstrated the hazard a water works assumes in contracting for the cleaning and painting of tanks. In this case an innocent appearing clause in the contract provided for replacement of leaking or faulty rivets at so much each. The painting job of $185 was increased by a bill for $3,000 for replacement of 1,250 rivets. The court awarded Ilmo judgment of $4,000 direct damages and $10,000 as punitive damages against the contractors.

Fluorides Held to Diminish Tooth Decay, May Be Added to Public Water Supply

The importance of control of fluoride in public water

36-In. Welded Steel Pipe Salvaged and Reconditioned for Use of the Coastal Municipal Water District of the Metropolitan Water District of So. Cal.

supplies has taken on new significance with revelation of studies demonstrating that it is not only fluoride in excess of 1.5 parts per million to be feared as causing mottled enamel in children's teeth but that fluoride deficiency below 0.8 to 1.0 parts per million is now found to have a positive correlation with dental caries or tooth decay.

There is actually a proposal to set up in New York State a study in two cities of about 30,000 population each a demonstration study in which the fluoride of one city will be increased to 0.8 to 1.0 ppm. by the addition of 14.6 lb. per million gallons of sodium fluoride, while the other city will continue the service of water with the low natural fluoride of 0.05 ppm. The study will require 10 to 15 years of close examination and statistical record of the 5 to 14 year old group of about 4 200 in each of the two cities. The names of these cities, about 30 miles apart, have not been revealed.

While the proposal of adding fluoride is somewhat reminiscent of a similar proposal of a generation ago to add iodine on account of prevalence of goiter in populations served with water having low natural iodine content, the proposed study of controlled additional fluorides will be watched with great interest. Agriculturists have also been concerned over the possibilities of maintaining the optimum amount of boron in irrigation water required for maximum plant health and development.

Victory Gardens Another Superintendent's Headache

Victory gardens have been one of the year's problems to many water works managements. This well justified war activity has brought with it the demand for specially low water rates as a sort of subsidy by the water utility to encourage planting of such vegetable gardens. The author has been doubtful of the wisdom of this policy of granting low rates for vegetable gardens. Why should the person who digs up his lawn to plant vegetables receive a lesser water rate than he did for the lawn? Special rates mean added manpower requirements to administer at a time when there is a manpower shortage.

Normal Chlorine Dosage Prevents Waterborne Tularemia

The discovery that many mountain streams in some parts of the country carry Pasteurella tularensis, the causitive agent of tularemia, has also been answered by announcement of means of water treatment. This disease commonly affects wild and domestic animals and is acquired by man most commonly by direct bacterial infection during skinning, butchering or trapping birds and mammals, especially rabbits, from which it receives the common name of rabbit fever. Many infections are also caused by deer files and ticks. Waterborne epidemics have been reported in Russia in 1935 and in Turkey in 1936.

Through studies made at the Rocky Mountain Laboratory (Hamilton, Mont.), Division of Infectious Diseases, National Institute of Health, by Jellison, Steinhaus and Kohls, with H. B. Foote, Sanitary Engineer, Montana State Board of Health, it has been demonstrated that a residual chlorine content of 0.1 ppm. after 15 minutes' contact will render water safe. The results of these experiments indicating normal chlorine dosage will remove dangers of tularemia are most encouraging. It is further evidence that good water treatment reduces other illnesses beside those that have been generally recognized as waterborne in the past.

USPHS Drinking Water Standards

The new Public Health Service Drinking Water Standards adopted September 25, 1942, were made generally available by Public Health Reports, January 15, 1943. These standards are published with a Manual of Recommended Water Sanitation Practice prepared by a technical subcommittee, and are available from the Superintendent of Documents, Washington, D. C., for 10 cents a copy.

These new Standards and the Manual are directed toward the continued improvement of public water supplies. Sanitary engineers have been rather critical of some of the provisions. Many believe the accuracy involved does not warrant the optional requirement of testing with 100 ml. portions, especially since these require extensive changes in equipment and add considerably to the cost of certain media. There are many instances in which analysis of samples cannot be started within 12 hours of collection; temperature control is difficult, and the value of dechlorinating samples is questionable.

Reinforced Concrete Pipe in Water Distributing Systems

Shortage of steel plates and difficulty in securing large sizes of cast iron pipe continue to cause many

cities to install reinforced concrete pipe for supply lines and for distribution. The City of Chicago, heretofore having only cast iron pipe installed over two miles of 36 inch wire wound prestressed concrete pressure pipe to furnish a new war plant with 10 m.g.d.

It was found feasible to make an 8 inch tap from the 36 inch concrete pipe making use of a 36x8 inch sleeve. This had to be done by hard methods of chipping the concrete and burning off the spring steel, oil tempered wire as no cutting tool was found that would cut the hard wire. The connection withstood hydraulic test under 180 pounds pressure.

Detroit also for the first time installed 8,000 feet of 72 inch and 13,000 feet of 48 inch reinforced concrete steel cylinder pressure pipe and connected its water supply to 15,000 feet of 54 inch and 74,000 feet of 38 inch installed by the county.

Chicago South District Filtration Plant

Work on the country's largest filtration plant was resumed during the summer. Priorities granted by the War Production Board permit the completion of the Shore Intake, Low Lift Pumping Station, the chemical building, the chemical equipment and flocculators in the mixing basins. The photograph (page 5) shows formwork being erected for the hopper part of the chemical storage bins. The iron frames at the lower parts of the hoppers have been set in place.

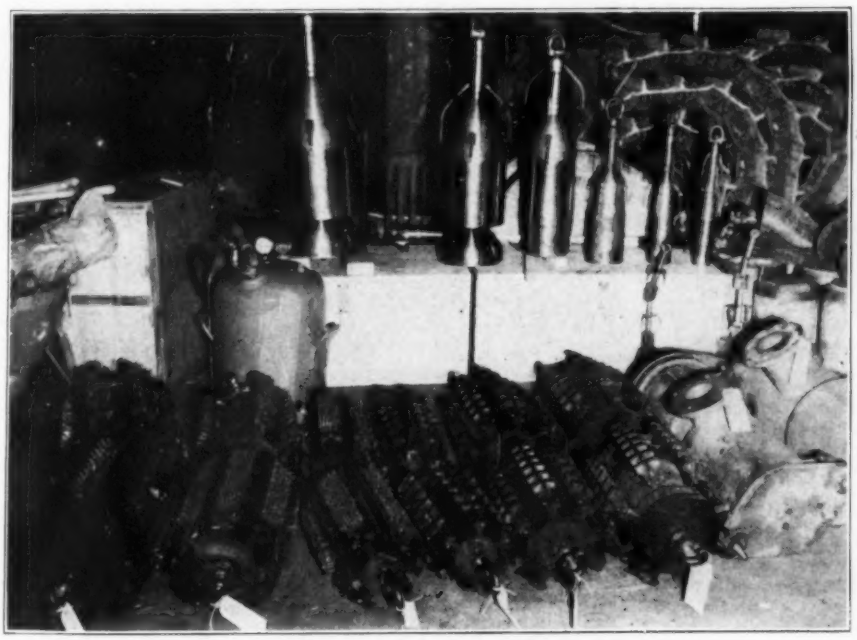
Steel Pipe Lines Recovered

In the interest of conserving steel, several notable salvage operations have been carried out on the Pacific Coast. The City of San Diego has made use of 22,000 feet of 42½ inch steel pipe salvaged from the abandoned Corral Hollow pipe line of the City of San Francisco. This pipe is reconditioned by spun concrete lining and gunite exterior coating. A joint similar to lock joint pipe was used. The pipe extends from El Capitan Dam to Lakeside. The photograph shows installation of the pipe across the San Diego River, where large numbers of well points were used to lower the ground water in the sand.

The Metropolitan Water District of Southern California acquired 56,400 feet of 36 inch welded steel pipe and appurtenances from the unused San Gabriel line of Pasadena and reconditioned it to serve the Coastal Municipal Water District. This required in addition 10,000 feet of centrifugally-cast reinforced concrete pipe.

Wier Measuring Water from a 500-Ft. Well in Heart of Salt Lake City. Yielding 3,825 gpm. a Submersible Pump Will Be Installed.

Danbury, Conn., and New Albany, Ind., reported lining of old cast iron pipe with concrete. Some of the tools used are shown in an accompanying photograph.



Tools Used in Lining Pipe with Concrete
(Various Sizes of Scale Cutters and Cleaning Brushes. In Rear Are Several Lining Mandrels—4 to 12 in. sizes.)

Water in the Desert

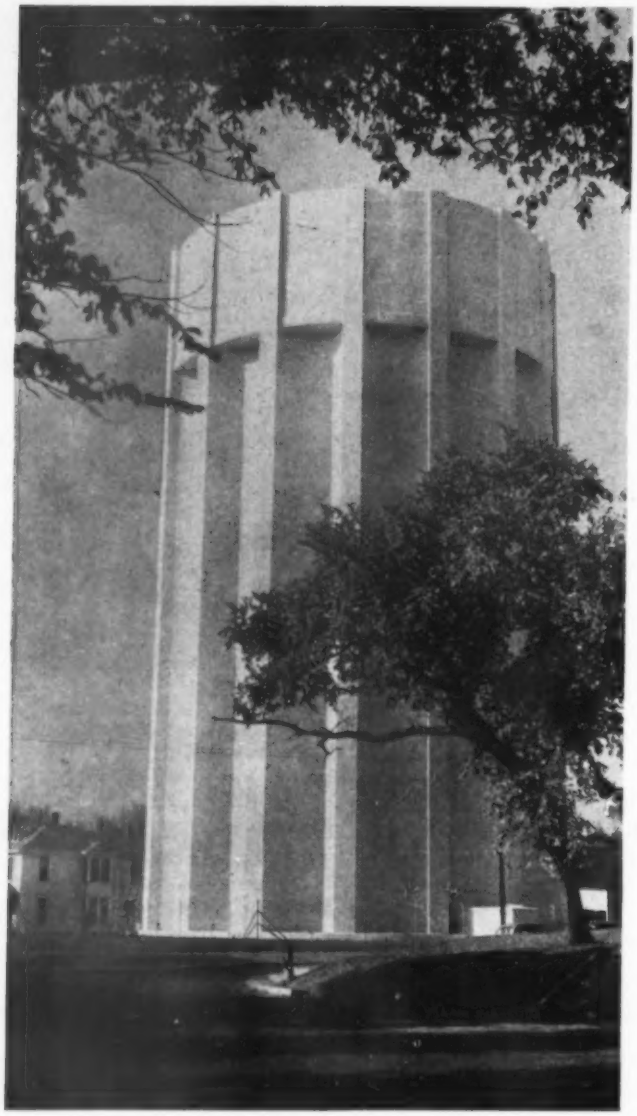
The Army continues to take water at numerous places from the Colorado River Aqueduct for its desert training centers and from Lake Matthews for Camp Haan and March Field. Average use is about 3 m.g.d.

Well in Business District

At Salt Lake City a new 500 feet deep well was drilled within two blocks of the Hotel Utah at the center of the city in order to be adjacent to a 24 inch main laid years ago when there was ample surface water. On test the well yielded 3,825 g.p.m. Located in a city park, a Byron Jackson submersible pump will be installed, making unnecessary any structure above ground.

Stops Leaking Reservoirs

In these days of conservation of water and minimum use of materials is a good time to check up on reservoir and distribution system losses. At St. Paul, Leonard Thompson reports much former leakage from reservoirs and conduits due to extreme temperature changes and unstable ground. Bentonite as a one to one mixture with clean, dry plastic



The People's Tower

(In Topeka the Water Tower Is a Monument to the Citizens Who Helped Build It.)

sand was used in strips about 10 inches wide and 1 inch deep over all floor expansion joints and at junction with walls. When liable to scour, a 1 inch cover of ¾ inch gravel was laid on the Bentonite to keep it in place. Experience demonstrates the method of treatment is completely effective in preventing leakage and it requires no reconstruction.

Stack Gases Used for Recarbonation

St. Paul is one of the few cities making use of stack gases for recarbonation. CO_2 recovered from coal burning boiler stacks is used to supply the water softening needs for rates from 25 to 60 m.g.d. Stack gases are first cleaned by a cyclone soot remover. The gases are then fed through a plenum chamber 7x7x40 feet long, constructed with wooden baffles. As the gases enter the chamber they are sprayed with raw water or even with sludge from the softening process containing a high calcium content, being more successful than a filtered water spray. The plant is highly successful in operation.

The "People's Tower"

Topeka's first overhead water storage is of monolithic concrete construction. The foundation is set on bedrock 30 feet below ground surface and provides for one million gallons of ground storage, while another million gallons is provided as an elevated tank 120 feet above ground and 90 feet in diameter. The name, the "People's Tower," comes from the fact that labor shortage required volunteers from other city departments and the general citizenry in order to keep concrete pouring in the monolithic structure. Architecturally and in service, the tower does honor to all who gave their services.

Philadelphia-Detroit Cooperation

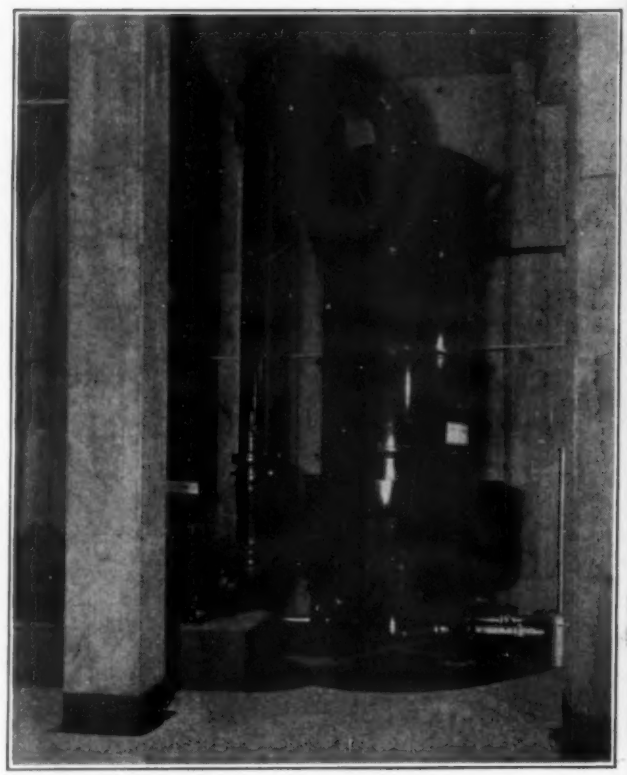
An example of domestic "lend-lease" is found at the Modern Avenue Peak Load Station of the City of Detroit.

The picture shows the inside of the station. The four pumps shown are the 40 million gallon units which were obtained from the city of Philadelphia on the lease-lend basis and on which there has been a considerable amount of publicity.

This station was constructed by the F. W. A. so as to insure uniform pressures, particularly to that vast group of industries in the northeast section of Detroit and in the same direction but beyond the city limits. The government constructed two large arsenals beyond the city limits and the necessity of uniformity of pressures for machine tool operations became so apparent early this year that this station, together with the appurtenant pipe lines, was constructed by the F. W. A. at an approximate cost of perhaps $550,000.

Water Works Progress in Los Angeles During 1943

Greatly increased population and industrial demands in Los Angeles created a peak hour water consumption of 727 mgd., a peak day of 484 mgd., and prolonged the peak seasonal demand so that for a period of 10 weeks

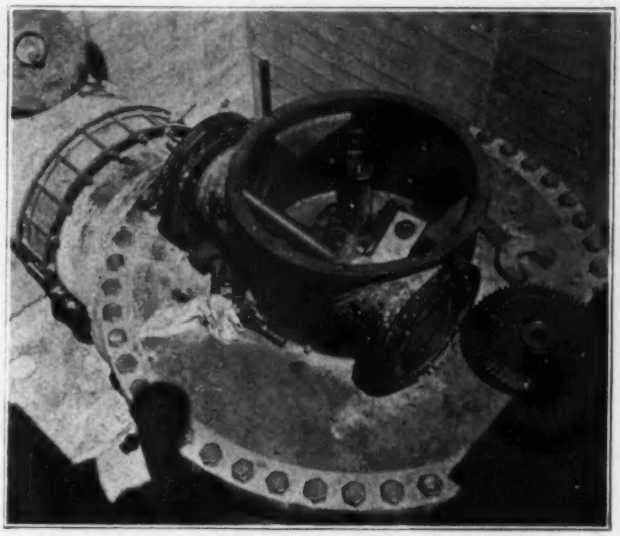


Cyclone Soot Remover for Cleaning Stack Gases for Use in Recarbonation

the daily demand averaged 415 mgd. The Municipal Water System has an ample supply of water from its Owens River Aqueduct and Los Angeles River sources with a supplemental supply from existing feeder lines of the Metropolitan Water District of Southern California. However, because of increased population and around the clock operation of war industries, local distribution deficiencies have developed during this peak summer use. Wartime restrictions on the use of materials has delayed the installation of certain much needed trunk lines and enlargements necessary to correct these deficiencies.

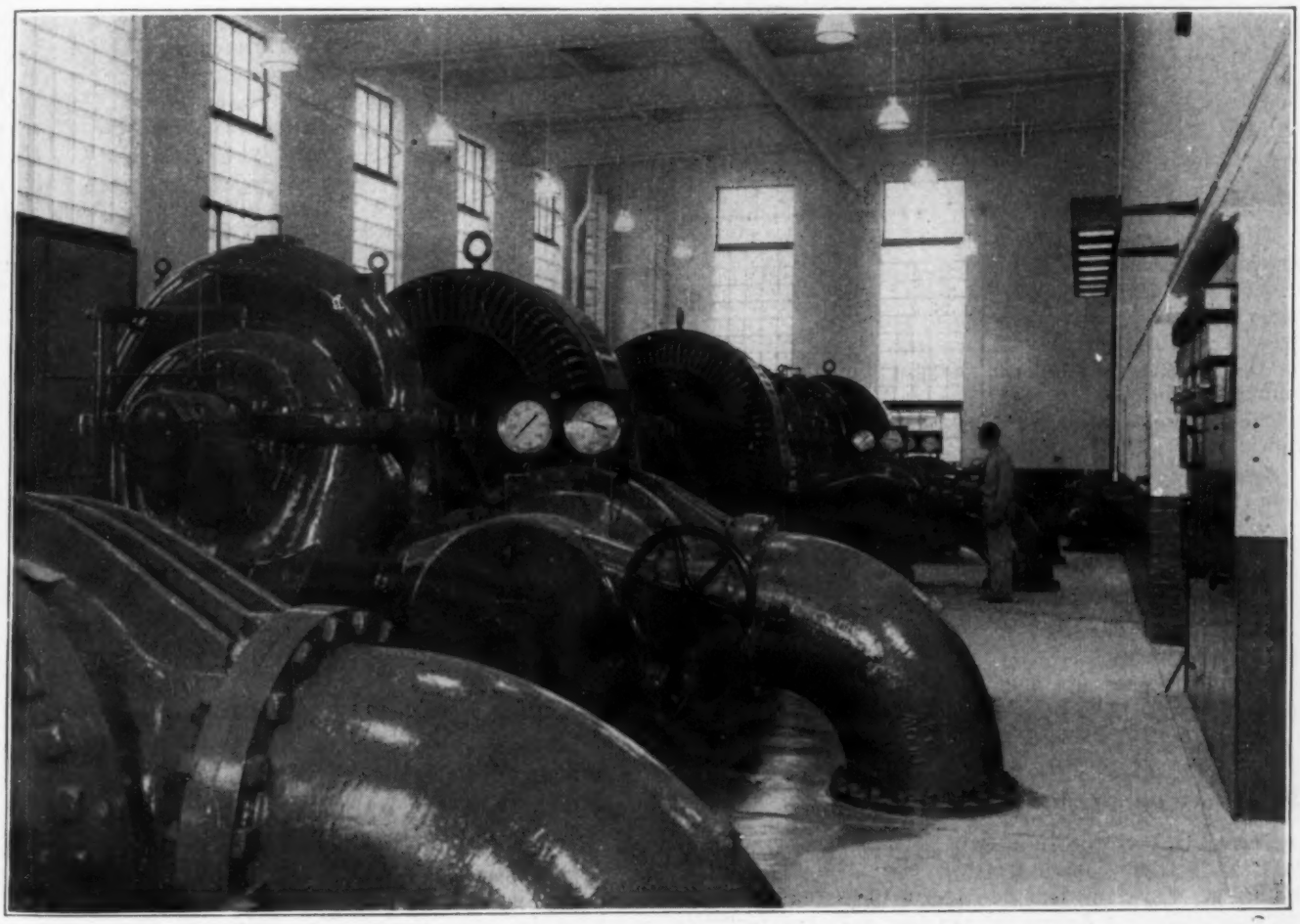
Construction work is progressing on the installation of the New Los Angeles River Supply Conduit consisting of 66-in. reinforced concrete pipe. A total of 12,000 ft. of this pipe line is being installed presently. The new River Supply Conduit will replace two old and badly deteriorated gravity conduits installed in 1904 and combine their flows into a pressure line, discharging the entire Los Angeles River supply into Silver Lake Reservoir, thus providing regulatory storage which formerly was lacking on a portion of the Los Angeles River supply. The new 66-in. reinforced concrete pipe line is scheduled to be placed in operation about March 1, 1944, which will complete the reconstruction of the Los Angeles River Supply System from Crystal Springs to Silver Lake Reservoir.

A 24-in. welded steel pipe line was installed from the Lomita Pumping Plant to Figueroa Street in the harbor area to provide an additional trunk line and eliminate the local distribution deficiency in delivering Aqueduct water through the Harbor Trunk Line to the harbor area. In order to conserve critical materials on this project, pipe which was no longer useful because of a system change was salvaged from the San Fernando Valley District, reconditioned and installed in the Harbor District.



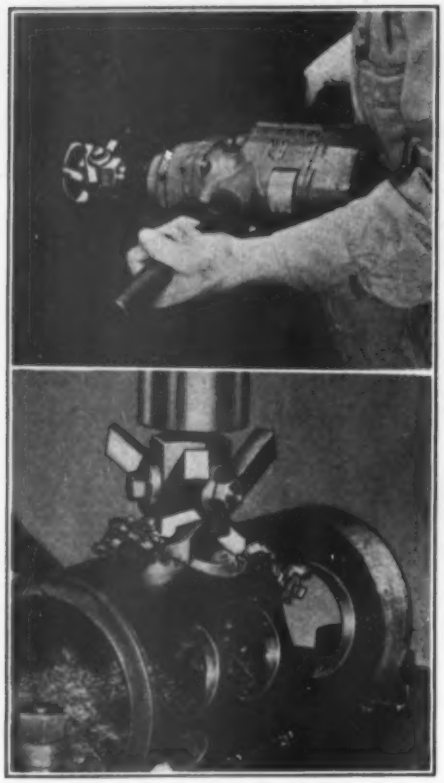
30-In. Rotary Cone Valve Installation at Los Angeles

A large number of roto valves are being installed as rapidly as available manpower permits at strategic points in the distribution system in order to provide positive shutoff under emergency conditions. The pro-



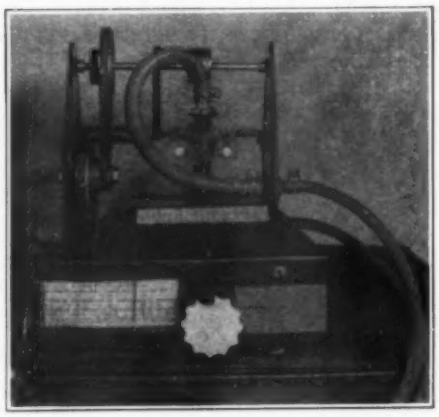
(Photo by Larry Foto Service—Detroit)

Lend-Lease at Home—Philadelphia's DeLaval Pumps and Chapman Cone Valves Installed in Detroit's Modern Ave. Peak Load Station

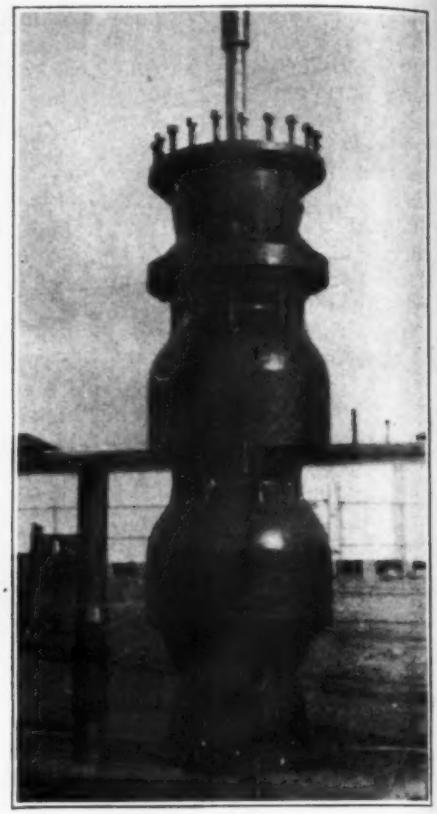


Clark Hole Cutter
(Forerunner of several new tools)

Ferguson-Pascoe Bob-White Buried Box Locator
(In other places they locate enemy land mines)



Var-I-Feeder by Chem. Feeds
(Tune like a radio)



"The Midget" and "The Giant" from Layne-Bowler's Pump Family

gram of emergency inter-system connections with other water utilities adjacent to the Municipal System and with the Metropolitan Water District's Southern California Feeder Line, which was begun in 1942, was completed in 1943.

Equipment News

No large items of equipment were developed during this year when attention was largely directed to wartime operation and maintenance of present equipment. Pumps brought on the market ranged from midget pumps of the Eastern Engr. Co. to the mammoth centrifugal pumps for deep wells made by the Layne-Bowler Co.

Small proportioning chemical feeders and new portable chlorinators appeared, as did a new device for locating buried meter and valve boxes. Plastic tubing was presented to the trade in several sizes by different companies. Most other new equipment items are included in this list: cutting tools, measuring devices, timers, gears and other accessories. Several types of new electrical motors were marketed along with self-cleaning strainers and floor stand hoists for screw stem gates. Of specific use for water mains was a new plug for main ends.

Dogs Have Important War Jobs, Too

The East Bay Municipal Utility District serving Oakland and other communities on the east side of San Francisco Bay now has five police dogs in service at various important district structures, and they feel that the protection afforded is much superior to that obtained by using guards alone. This practice has been followed in a number of military establishments and at some industrial plants, but it is not known to be used by any other water supply organization. They like it very much and feel that it has been a good investment, both in the saving of guard expense and in obtaining more satisfactory protection. These dogs cost about $750 and come well trained and ready to go into immediate service.

Emergency Equipment Used

During the heavy winds of early December the East Bay District had occasion to use some of their emergency equipment designed principally for emergencies in connection with the present war. Although the high winds have not bothered their structures in any way, they have given the power company a great deal of trouble and the district has been without power at a number of pumping plants and at one of the filter plants. It was necessary, therefore, to move its portable gas engine driven electric generator to the Orinda filters and to move out two of its portable gas engine driven pumping plants in order to keep the filter plant and the pumping plants which were without power in operation. All equipment functioned in excellent manner and demonstrated its usefulness at such times of emergency.

Delayed Weather Reports

War restrictions on release of weather reports has lessened general knowledge of serious floods which occurred in many places. The Missouri, Upper Mississippi, Willamette and many other rivers ran rampage during portions of the year and caused large losses and gave many civilian defense and mutual aid organiza-

tions a chance to prove their metal. There were no epidemics.

At Camp Leroy, near Pasadena, Calif., what is believed to be a new national 24-hour rainfall record of 26.12 inches was made on January 22-23. Fortunately, the area of maximum intensity was limited and flood losses were small in comparison with 1938.

At the same time there has been rather severe drought along the East Coast centering at Baltimore, where use of water for lawn sprinkling was curtailed during the summer.

But by and large, 1943 was a good year for water supply, as has been the other war years. If widespread drought should occur, many war flush communities will have severe water supply problems.

"Dorgie"—Trained Doberman-Pincer Guard Dog of East Bay Municipal Utility District

Reuben Brown Los Angeles' New Sup't of Sewer Maintenance

Succeeding Fred A. Batty, recently retired. Reuben F. Brown has been appointed Sup't of Sewer Maintenance, and has charge of what is believed to be the world's most extensive and complex sewer system. Certainly no city has more sewerage operating and maintenance problems than has Los Angeles with its storm-flow, sewer gas and outfall problems. The appointment was announced by H. P. Cortelyou, Engineer Director of the Bureau of Sewer Maintenance and Sanitation.

Reuben F. (Daredevil) Brown

Mr. Brown, who has served the City of Los Angeles since 1922 as Construction Inspector and Engineer, has for the past 10 years been Ass't Maintenance Sup't. His work in sewer maintenance has attracted considerable attention and his articles on "Practical Methods of Sewer Maintenance" published in Sewerage Works Journal and his report on the now famous sewer exploration and inspection made in person from a small skiff traveling the length of a gas filled sewer to secure a photographic record of conditions of the gas attacked North Outfall Sewer of Los Angeles, received world-wide publicity and recognition. For this hazardous exploit he was given (by us at least) the nickname "Daredevil" Brown. The accompanying picture is of Brown with his miniature camera and oxygen mask used on the inspection tour of probably the world's most dangerous sewer.

A native of Bay City, Mich., Brown came up the hard way. He won recognition as Director of Physical Education for the Jackson, Mich., Board of Education and became prominent also in Y.M.C.A. work. In World War I he served as Master Engineer in the Hdqtr's. Engineering Detachment of the famous 2nd Div. A.E.F. After that, think he'd be afraid of little things like sewer rats and the lethal H_2S in sewer gas—well just take a look at him.

"The Man Without a Name"

No less than a half-dozen readers have pitied us enough to write that the gentleman's name on page 432 of our December issue (Report of the Missouri Valley Section Meeting) is Stanley of Monsanto.

Well, we had it all there when the proof was read, but somehow the first line of type (I. J. Stanley) in this caption was dropped during make-ready, and Mr. Stanley came out "a man without a name," and just—

Assistant Sales Manager
Monsanto, St. Louis

At any rate he wasn't "a man without a company." (Note: No charge to Monsanto for this space—Ed.)

Water Company Gives Bonus

The Interesting Case of a Water Mutual

For the third consecutive year, the Oildale (Calif.) Mutual Water Co. will again distribute a $4000 "Christmas Bonus" to their 2300 stockholders. This bonus, instead of being in cash, will take the form of free water for the month of December, according to a decision by the company's board of directors.

Heber Bradford, president of the company, stated that the excellent financial status of the company warrants a year-end dividend to consumers again this year. However, only those users who have paid their water bill up to and including the month of November will receive the year-end dividend, Bradford declared.

EXPERIENCES WITH UP-FLOW TYPE BASINS

A Discussion Based on Pilot Plant Studies

By H. O. HARTUNG
Chemist
ST. LOUIS COUNTY WATER CO.
UNIVERSITY CITY, MO.

A FEW years ago the St. Louis County Water Company anticipated the need for a new water purification plant to augment its present treatment works. Although considerable experience had been accumulated in the operation of its present water plant, softening and clarifying Missouri River water, nothing was known regarding the value and utility of the new accelerated up-flow basins in connection with their possible use in a new treatment works. The advertised claims for these basins were both enticing and promising. However, the literature contained only a few papers with reliable operating data.

Because the up-flow sludge blanket or slurry pool type basins seemed promising and because a flow sheet based on sound engineering judgment can only be drawn from proven experience, a pilot water purification plant was built on the banks of the Meramec River near Fenton, Missouri. Within that pilot plant was placed a 7200 gpd Precipitator, a 36,000 gpd Hydrotreater and a 36,000 gpd Accelerator each borrowed from their respective manufacturers. It was hoped that a number of doubtful questions regarding performance characteristics could be answered in pilot plant operation. Some of these questions were:

1) Will the accelerated up-flow type basin increase the softening yield per unit of lime added to the water?
2) Is the effluent of the accelerated up-flow basins chemically stable, thereby eliminating the need for recarbonation when softening?
3) Will these basins function equally well as softening units, clarification units, or combined softening and clarification units?
4) Is the usually specified one hour detention sufficiently long to soften or to prepare the water for filtration?
5) Is more or less chemical coagulant required for clarification than in conventional treatment plants?
6) Will high turbidity interfere in any phase of their successful operation?

The Author

This short discussion is based on observations made during a year and one-half of pilot plant operation during which time the up-flow units were operated in an attempt to answer the above questions.

The difficulty is extrapolating from pilot operation to full scale production was fully observed, consequently the conclusions presented herein are limited to pilot plant studies and Meramec River water. It would not be fair to make limitless generalizations based on this work.

First, a general statement of up-flow basin operation seems to be in order. In the estimation of the pilot plant operators all of the units were found to follow the generally accepted principles of water treatment practice. A softened and clarified water was nearly always possible in the tanks by some manner or other, but such performance was the result of principles generally understood, from common water plant operation experience. For example, it was found that too violent mixing will cause floc destruction; too slow mixing or too short mixing time will prevent coagulation; short mixing times can sometimes be compensated for by increased coagulant dose; immense and heavy floc will separate better than small or poor floc; high velocities will cause floc "carry-over"; magnesium precipitation in the absence of a coagulant will result in some turbidity removal; calcium precipitation gives much less turbidity removal than magnesium precipitation, etc.

The advantages of the up-flow basins seem to be in that purification plant processes are combined in a convenient, small package.

Answers to the Questions

In the following paragraphs a few statements will be made in answer to the six questions, given above, which prompted pilot plant studies.

1. *Will the accelerated up-flow type basin increase the softening yield per unit of lime added to the water?*

All three of the upward flow basins which were studied often enabled appreciably better softening per unit of lime added than can be easily obtained in the conventional lime softening type plant. However, it has been observed that, usually, in order to obtain improved hardness precipitation, the slurry concentration in the unit must be considerably higher than the about 1 to 1½ per cent by weight or less recommended by the various manufacturers. Numerous data were obtained where the residual calcium in the effluent of an up-flow unit was as low as 15 p.p.m. as $CaCO_3$ when the slurry concentration equalled 4, 5 or 6 per cent by weight. In contrast, with similar waters, or with the same water in one of the other up-flow units, when the slurry concentration was one per cent or less by weight, the residual calcium content of the effluent water was two or three times higher. Thus, in order to improve hardness precipitation, it is believed that softening must be in the presence of *considerable* previously precipitated hardness slurry.

In Figure 31-B the average effluent hardness of the several pilot plant up-flow units studied are plotted against their frequency of occurrences. Curve-1 gives the average pilot plants effluent hardnesses when the slurry in the units was *two per cent or greater by weight;* aver-

age about 3½ per cent. Curve-2 shows the average effluent hardnesses when the retained slurry was one and one-half per cent or less by weight, average about ¾ per cent. The horizontal distance between curve (1) and (2) shows the improved hardness reduction obtained by increasing the slurry concentration.

2. *Is the effluent of the accelerated up-flow basins chemically stable, thereby eliminating the need for recarbonation when softening?*

A completely chemically stable lime softened water was approached, but never realized in these up-flow units even when the slurry equalled 4 to 5 per cent, by weight. However, when the slurry concentration was up to 5 per cent, the effluent water was very often within about 5 p.p.m. ($CaCO_3$) of complete stability as measured by the calcium carbonate stability test. And, such a degree of stability has been considered satisfactory and justification for the elimination of recarbonation whenever the water does not have appreciable caustic alkalinity. While much higher slurry concentrations than 5 per cent might be the means to a *completely* chemically stable water, such a water is not believed necessary.

On the other hand, when the slurry concentrations in the up-flow units were only about 1 to 1½ per cent, the degree of chemical instability was often about 20 to 25 p.p.m Thus it is believed that an accelerated up-flow softening tank should be designed to hold about 5 per cent slurry concentrations by weight before recarbonation can be entirely eliminated from the plant flow sheet even though the softened water does *not* contain causticity. See Table 1.

3. *Will these basins function equally well as softening units, clarification units or combined softening and clarification units?*

All of the up-flow units studied were operated successfully as softening and coincidentally as clarification units. However, when operating the up-flow units with high retained slurry concentrations for maximum hardness removal efficiencies, it was observed that better over-all performance could be obtained when softening and coagulation are separated processes. First, the slurry seemed to have a demand for coagulant in itself. Such demand for coagulent was out of proportion to the amount of turbidity carried by the water. Laboratory jar tests usually indicated a much less coagulant charge was required to produce satisfactory water clarity from a turbid water in a conventional basin than was required by the up-flow unit. Second, because of river water changes and changes in chemical treatment it was not unusual to have considerable slurry boil out of these units with the effluent water. In such cases secondary clarification or sedimentation was essential. Finally, for some conditions of the water treated, if the coagulant dose was high in order to produce clarity, it was also sufficiently high to interfere with softening by conversion of some of the calcium to calcium sulphate. For these reasons, and because of the ease with which these basins may become upset when conditions of operation change, it was recommended that an up-flow softening basin be utilized only as the first stage of a two stage treatment plant

TABLE 1
Effect of Slurry Concentration on Chemical Stability as Measured by the $CaCO_3$ Stability Test
(Each Comparison Based on Averages of Five or More Days)

Alkalinity				
Raw Water	Softened Water	Lime Dose Gr./Gal.	Slurry Concentration % by Weight	Alkalinity Drop During $CaCO_3$ Stability Test p.p.m. $CaCO_3$
1-172	38-61	7.4	3.8	6
1-169	53-98	7.1	0.4	33
0-160	27-50	6.6	4.2	5
0-160	40-84	6.5	1.5	25
0-148	22-45	6.4	2.3	7
0-150	26-50	6.4	1.3	13
0-114	35-68	4.8	4.1	20
0-115	42-78	4.8	0.2	33

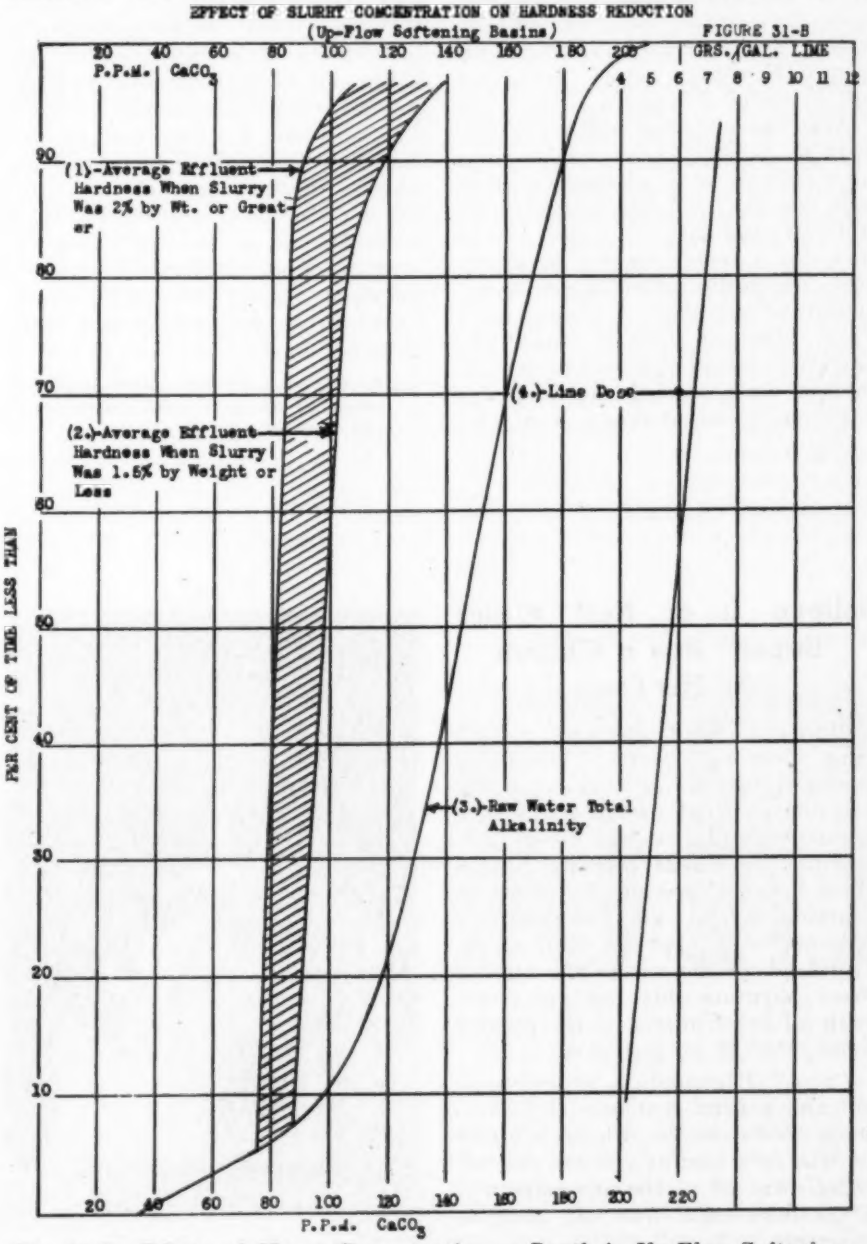

EFFECT OF SLURRY CONCENTRATION ON HARDNESS REDUCTION
(Up-Flow Softening Basins)
FIGURE 31-B
P.P.M. CaCO3
GRS./GAL. LIME
(1)-Average Effluent Hardness When Slurry Was 2% by Wt. or Greater
(2.)-Average Effluent Hardness When Slurry Was 1.5% by Weight or Less
(3.)-Raw Water Total Alkalinity
(4.)-Lime Dose
PER CENT OF TIME LESS THAN
P.P.M. CaCO3

Fig. 31-B: *Effects of Slurry Concentration or Depth in Up-Flow Softening Units on Hardness Reduction*

prior to filtration. Then clarification (coagulation) should be carried out in secondary basins.

4. ***Is the usually specified one hour detention sufficiently long to soften or to prepare the water for filtration?***

One hour detention time in the up-flow tanks studied in the pilot plant was very often sufficient to satisfactorily soften or to coagulate the water for filtration. Yet, when slurry concentrations were high for efficient softening purposes, it seemed very desirable to increase the detention beyond one hour in order to effect a better water slurry separation in the final zone of the up-flow basin. A thick slurry in the bottom of the tank resulted in an increased amount of floc rising upward with the effluent water above the normal slurry level. In order to eliminate such flock from the tank effluent water, an increased tank depth seemed necessary, which would result in added detention.

Also, whenever the water was difficult to clarify the floc conditioning time allowed in a one-hour up-flow tank was not sufficiently long to effectively coagulate the water. At no time did a sludge blanket or slurry pool compensate for insufficient coagulation or too short a mixing time. Thus, during periods of "weak" coagulation, longer than one hour's detention time seemed desirable for purposes of coagulation and mixing.

5. ***Is more or less chemical coagulant required for clarification than in conventional treatment plants?***

This question was answered during the study by two approaches. First, daily laboratory jar tests were made using the same technique and correlation employed for setting the dose at the existing treatment plant of the St. Louis County Water Co. but using Meramec River Water. These laboratory jar tests consistently showed that less coagulant would be required in a plant similar to the present treatment works of the St. Louis County Water Co. than in the pilot plant up-flow units.

Also, one unit of the pilot plant was moved to the Missouri River and operated in parallel with a coagulation unit of the existing Missouri river treatment plant. Here again, considerable less coagulant was used in actual plant operation than was required by the pilot plant unit.

The slurry blanket or slurry pools in pilot plant operation did not function as a filter medium, such as sand does in a filter, effecting water clarification. Rather, the turbidity of the effluent water increased as the slurry concentration in the basin was increased. Such clarification as is obtained in the up-flow basins, is believed to be by other means than filtration.

6. ***Will high turbidity interfere in any phase of the successful operation of the up-flow units?***

Only a limited number of waters in which the turbidity exceeded 750 to 1000 p.p.m. were studied in the pilot plant units. Yet in every instance, it was impossible to retain a heavy slurry concentration in the tank, desired for softening, when considerable turbidity was being removed. Such slurry as was in the tank would boil to the surface and pass out with the effluent water or require considerable sludge blow off to prevent a very turbid effluent water. Thus turbidity interfered with softening.

Then too, when the influent water contained considerable turbidity the coagulant requirements of the water were very much higher than indicated as necessary by laboratory jar tests comparisons. The disparity between laboratory jar test coagulent requirements and pilot plant coagulant requirements seemed to increase as the turbidity of the water increased.

Conclusions:

The up-flow units seem to be particularly advantageous as softening basins when operated with heavy retained slurry concentrations. They seem to function best with relatively clear waters.

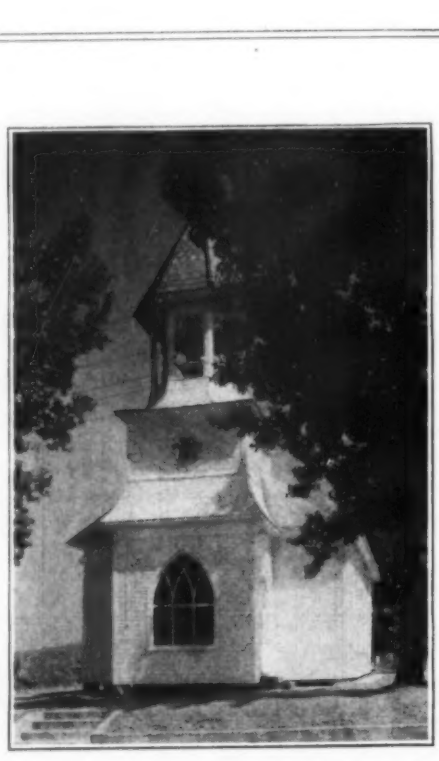
The up-flow units can also be used for simple clarification purposes. A lower first cost might offset the increased coagulant costs required in operation.

Believe It or Not! Water "Super" Has a Church All His Own

Here's a piece of news of the "man bites dog" variety. When told that a certain water works manager was the outright owner of his own private church we had to go see. During the recent meeting of the West Virginia Section of AWWA in Clarksburg, W. Va., we had the pleasure of a visit to Scotland G. Highland's home out in the hills of West Virginia—his boyhood home with all the features of the pioneer home, that it is, preserved.

"Scot" Highland is superintendent and general manager of Clarksburg's water works. He has a brother who is a leading banker and another owns all of the newspapers of Clarksburg—and, you can imagine the rest.

What about the little church?



"Scot" Highland's Church.

Well, here's the story. On the lawn adjoining that of "Scot's" old home stands one of the early churches of the West Virginia hills. It's a little gem, and when the congregation outgrew it "Scot" decided he'd like to buy it—*and he did.* While he hasn't equipped it with a parson, he has had this quaint little church of 1873 renovated throughout — and it's all his own to do with as he pleases.

We might add that "Scot" keeps Clarksburgh's water works just as he does his ancestral home and his little church—immaculate.

What'a Chemist!

Chemist: "You see, in this flask I have peroxide which makes blonds; and, in this one I have a dark dye that makes brunettes. But, in this third bottle is gin—, and that makes both."

(From Pittsburgh Meter's "Water Journal")

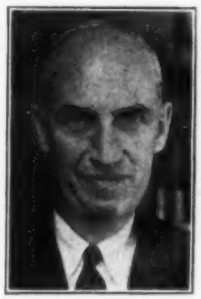
WISCONSIN SECTION'S MEETING

Held Jointly With That of Engineering Society of Wisconsin in Milwaukee

THE Wisconsin Section of AWWA held its 22nd Annual Meeting in Milwaukee on October 19, 20 and 21. In as much as the Wisconsin Section Chairman O. J. Muegge, Ass't State Sanitary Engr., was also secretary of the Engineering Society of Wisconsin, and Joseph Lustig, City Engineer of Janesville, Wisc. was president of the Engineering Society and member of the Wisconsin Section, it seemed appropriate enough that the two organizations stage a joint meeting. The combination produced a large meeting and well attended sessions.

In the latter direction secretary Leon Smith of the A.W.W.A. Section called attention to the fact that the 1943 meeting constituted the fifth successive meeting which could boast an attendance above the 200 mark. Chairman Muegge, reviewing the development of the Section with its present 117 members showed the satisfactory charted growth of the Section but also pointed to the fact that the meeting attendance curve exhibited a condition which should produce a parallel curve of the same steepness in member growth from the 445 public water supplies of Wisconsin. In earlier years when the membership curve began to lag something was done about it, with satisfactory results, and that now was seemingly the time to repeat the job and bring more of Wisconsin's 445 water supplies into the association. [Sounded to this reporter to be the "opening gun" of a new member campaign in Wisconsin as a forerunner to the Annual Meeting of AWWA scheduled for Milwaukee in June.—Ed.]

Nat'l Director
Arthur P. Kuranz
Superintendent
Waukesha, Wis.



Secy.-Treas.
Leon A. Smith
Superintendent
Madison, Wis.

Technical Session Highlights

The Milwaukee meeting produced an unusual number of particularly noteworthy papers, a lecture and demonstration of "Some Aspects of Ultra High Frequency Radio" by Dr. Glenn Koehler, University of Wisconsin, and a demonstration of an electro-magnet for locating underground pipes and other hidden metal objects by Basil Miller, Supt. of Utilities at Fennimore, Wis. and inventor of the locator. [This device and its uses was described by Mr. Miller in his article in the Sept., 1943 issue of *Water Works and Sewerage.*]

Chairmen

(Retiring)
O. J. Muegge
Sr. Asst. Engr.
Wis. Dept. Health
Madison, Wis.

(Incoming)
Jos. P. Schwada
City Engineer
Milwaukee, Wis.

Amongst the papers of distinction there were three of outstanding merit. "The Distribution System" by Louis R. Howson, constituting a reference work on this important subject, has already been published in *Water Works and Sewerage* for November, 1943 and in the November A.W.W.A. Journal. It will also be given a prominent position in the 1944 Reference and Data Number of *Water Works & Sewerage* for permanent reference.

Another outstanding contribution to water works literature, and representing pioneering work deserving a prominent position in any Manual on Rate Making, was that by J. P. Schwada, City Engineer, and Edward Tanghe, Ass't. City Engr., of Milwaukee which analyzes factors in and suggests new conceptions in "The Determination of Water Rates." We predict that much more will be heard of the procedure of rate making developed in Milwaukee and reported in the Schwada-Tanghe paper.

The third highlight of the program was the masterful paper on "The Transmission of Virus Diseases by Water" developed and presented in praiseworthy manner by Milwaukee's young Health Commission, Dr. E. R. Krumbiegel. From this discussion there appears about as much relationship between water supply and infantile paralysis as between outbreaks of this dread disease and the appearance of garlic in milk or the disappearance of straw hats in September.

The open and forthright discussion of the new U. S. Treasury Standards for Drinking Water was also a noteworthy incident on the program. And, another interest getting demonstration was that by Dr. C. C. Ruchhoft, who exhibited the several tests developed in the U. S. Public Health Service laboratories to detect poisons in water and methods of eliminating such poisons and tests indicative of sufficient chlorination, activated carbon, and/or other treatment to insure their elimination. These demonstrations were colorful and interesting even if their practical consideration may have now, we trust, become of secondary consequence.

Entertainment

As dear as white space now has become we can not resist putting in this "plug" for Milwaukee's famed Schlitz Brewery who staged a complimentary and most excellent Buffet Supper, with entertainers and all of the light amber fluid that comes in the well known brown bottles that

Vice-Chmn.
Blaine Page
Superintendent
Shawano, Wis.

Host
Herbert Brown
Superintendent
Milwaukee, Wis.

might be wanted and served in thirst creating Pilsner glasses. Much "chinfest" was heard and following the supper Jo. Schwada showed some excellent sound movies of our global sea and air operations of our Navy and Air Forces.

The second evening was given over to the Joint Dinner and Floor Show.

Officers Named

The following were named as officers for the ensuing year and elected unanimously.

Chairman: J. P. Schwada, City Engineer, Milwaukee, Wis.

Vice-Chrm.: Blaine Page, Sup't., Shawano, Wis.

Sec'y.-Treas.: Leon A. Smith, Sup't., Madison, Wis.

Trustees: Jas. W. Myers, Jr. Sup't., Kenosha, Wis.; Harold L. Londo, Sup't., Green Bay, Wis.

National Director of the Section is Arthur P. Kuranz, Sup't. at Waukesha, just beginning his three year term as A.W.W.A. Board Member.

Papers and Discussion

"Factors Entering into the Determination of Water Rates"—by J. P. Schwada, City Engr., and Edw. Tanghe, Ass't. City Engr., Milwaukee, Wis.

Although it will be difficult to do even near justice to this paper we will attempt to sketch some of the revelations in this pioneering study and the results.

The paper was presented by Mr. Schwada, who explained that the study was made as scientifically as possible and therefore took into account the length and size of mains between the filtered water pumping station and the customer in addition to the matter of volume consumed and more particularly to demand peaks of the larger customers. The biggest problem in the Milwaukee case was the rates which should equitably be charged suburbs taking water at wholesale for distribution and industrial plants—more particularly those outside of the city limits of Milwaukee.

In the studies recording pitometers and recording meters were employed. Suburban peak demand was 3 times day's average and for industries demand peaks were higher than for system as a whole. The importance of this rate study to Milwaukee was made known by the fact that

Louis R. Howson Consulting Engr. Chicago, Ill. (His paper a reference work.)

Joseph Lustig City Engineer Janesville, Wis. (President, Engr'g Society of Wis., meeting jointly.)

30% of total pumpage goes to industries. It was concluded that the only equitable and fair rates were those which should vary directly as the distance of the customer from the pumping station and size of main considered minimum to provide peak demand flows in addition to the quantity of water. Both industrial plants and suburbs should be charged on the same basis.

Fixed charges entering into the rate base should include the entire distribution system and the purification works. What is commonly known as unaccounted for water (non-revenue water) which leaves the pumps but is never accounted for in total meter readings is considered a legitimate cost to add to operating charges. In the latter consideration it was ruled by the Wisconsin Public Utilities Commission, which holds jurisdiction over municipal as well as privately operated water systems, that a reasonable figure for non-revenue water (unaccounted for water) was 10% of total pumpage and that any higher percentage could not be justified on grounds of reasonability. The data had been highly useful in fighting claims by industries and suburbs to preferential rates based on consumption. These cases had been decided in favor of the City of Milwaukee.

In reply to questions, Mr. Schwada stated that the Wisconsin court permitted a return rate on investment amounting to 4% in case of suburbs and only 2% on the City's share.

L. R. Howson, in complimenting the Milwaukee authorities on the rate studies, declared that the paper was really a manual on rate fixing and the development of the distance factor was true pioneering and a creditable job.

"Importance of the Distribution System" by L. R. Howson, Alvord Burdick & Howson Engrs., Chicago.

This splendid paper, earlier referred to as a reference work, is to be found printed in full and featured in our November issue. We urge the reader to read this paper carefully if he has not already and to preserve it. But for the scarcity of paper we would present a digest of Mr. Howson's paper in any event.

"Transmission of Virus Diseases by Water," by Dr. E. R. Krumbiegel, Health Commissioner, Milwaukee, Wis.

In view of the recently much publicized finding of the poliomyelitis virus by Chicago authorities in sewage treatment plant effluents, this authoritative discussion of the possibilities that infantile paralysis and other virus diseases may be transmitted by water was especially timely.

In brief Dr. Krumbiegel put water works men at ease by showing that not the least bit of evidence could be produced to show that water supplies had any connection with the transmission of dreaded infantile paralysis. Fact is, the thoughts of some that the disease is spread by infection of swimming pools with nose and mouth discharges of those ready to come down with the disease can not be proven. The presumption

Frank MacDonald Electro Rustproofing Co. Chicago

Albert Hintz, Jr. Manager, Water Dept. Oshkosh, Wis.

Robt. Colston Calgon, Inc. Chicago

Jerry Zufelt Superintendent Sheboygan, Wis.

Jas. Kerslake Supt. Filter Milwaukee

W. G. Kirchoffer Cons. Engr. Madison, Wis.

H. P. Binder Mgr. Pump Div. Allis-Chalmers Milwaukee

that the disease is spread by bathing places remains circumstantial and epidemics appear where there is no connection with swimming pools or beaches.

Getting back to water supply, Dr. Krumbiegel pointed out that epidemics have occurred more generally through cleanest water supplies, rather than in the least clean. Also, the incidence, amongst country folk is higher than amongst urban population, and has been more pronounced in deep well public supplies than in surface supplies. In addition, in epidemics there is no characteristic water borne flare-up of the disease, but a rather slow build up which points away from water or milk supplies.

Dr. Krumbiegel then went on to show that in sewage treatment the activated sludge process removes the polio virus and coagulation and filtration is effective in greatly reducing it. Chlorine is effective in destroying even high concentrations of the virus as demonstrated by Armstrong who reports that in potable water 1.5 ppm. of chlorine destroys the virus within 15 minutes of contact. With one hour contact 0.5 ppm. does the same job, even on the high concentrations used in Armstrong's studies. Chlorination also destroys the virus in turbid water and sewage effluents.

As said before, Dr. Krumbiegel's paper was excellently put together and presented, to have water and sewage works men reassured that they have facilities for coping with the polio virus should it appear in waters or sewages. Further, that no finger of suspicion could be pointed at water supply as the medium of transmission.

"The New U. S. Treasury Drinking Water Standards," by M. Starr Nichols, Chief Chemist, State Laboratory of Hygiene, Madison, Wis.

Dr. Nichols, after covering the history of the U. S. Treasury Drinking Water Standards, presented a highlight review of the new standards recently placed in use by the Treasury Department through the U. S. Public Health Service. The idea was apparently to invite open discussion and it did.

The matter of primary interest

Programmers

Basil Miller
Supt. Utilities
Fennimore, Wis.

Edw. Tanghe
Asst. City Engr.
Milwaukee

appeared to be the supposition that the use of 100 ml. portions (now optional in the new standards) was preferable to the old (and still permissible) 10 ml. portions used in the coliform group test. The other item was that of the greatly increased number of samplings designed to more effectively cover the distribution systems of the larger communities.

It was evident that the larger number of samplings had revealed conditions not heretofore suspected in the distribution system and had given such systems a questionable rating when compared to previous ratings. In the discussion as to proper sampling points it was aptly suggested by J. J. McCarthy, Chemist at Racine, that samples should represent points of greatest water use and those affecting the greatest numbers of consumers. In this direction schools and hospitals had been chosen in Racine as primary sampling points. By some it was felt that more sampling than called for in the earlier standard was justified, in particular for the smaller systems without much in the way of technical control. However, for the larger systems with technical control the ratio of number of samples based on population served seemed to have less justification and placed a load on the laboratory out of proportion to what may actually be justified.

[We should explain that the latter expression was heard after the session and not on the floor. However, the same opinion has come from other sources rather generally, and it is therefore commented upon here.—*Ed.*]

As to the 100 ml. portions vs. the 10 ml. portions the question was raised as to the justification for the larger, more unwieldy and expensive portion to work with. There was actual evidence reported which for some strange reason, when running 10 ml. and 100 ml. portions in parallel for a number of months, gave a higher coli index for the 10 ml. than the 100 ml. portions. All existing evidence seemed to point to less justification for the larger portions and many reasons to prefer the 10 ml. portions. The only reason for the larger portion, which was cited in the session by a representative of the U. S. Public Health Service, was that it provided a higher refinement in evaluation—i.e. with the 10 ml. portion the limit permissible is a coli index of 1, whereas with the 100 ml. portion the limit reduces to an index of .06 coli per 100 ml.

"War Gas Contamination of Water Supplies," by Dr. C. C. Ruchhoft, Chemist, U. S. P. H. Service, Cincinnati, O.

In this paper Dr. Ruchhoft presented a very thorough discussion of the characteristics of various poisonous gases and chemicals which might be used by the enemy and methods of detecting dangerous concentrations of such in water supplies. His lecture was followed by demonstrations of laboratory tests developed for the purpose of detection and identification of these poisons in water. It was reassuring

Jimmie Judge
Neptune Meters
Chicago

H. S. Merz
Supt. Water
Rockford, Ill.

D. W. Wallace
ACIPCO
Minneapolis

W. U. Gallaher
Supt. Water
Appleton, Wis.

Frank T. O'Dell
Mueller Co.
Chicago

Tom McGuire
Supt. W. & L.
Plymouth, Wis.

"Cliff" Bruden
W. & T. Co.
Madison, Wis.

to learn that two such single tests, as that for chlorine demand, and oxygen consumed would suffice to detect dangerous concentrations of any of the war gases commonly employed. For instance a dangerous concentration of Lewisite and other

"Prof." Ruchhoft and Class

Dr. C. C. Ruchhoft, U.S.P.H.S., Cincinnati, demonstrating rapid tests for war gases and poisons in water samples.

arsenicals would cause a jump in chlorine demand of as much as 50 ppm. and this would be hard to miss. However, any sudden increase in chlorine demand (loss of residual chlorine) would indicate some contamination. For mustard gas the oxygen consumed (permanganate) test will prove the tell-tale. So with both tests applied a certain indication is at hand. He explained both tests and how "Zonite," purchasable at almost any drug store, could be used for the single chlorine demand test with sufficient reliability and accuracy as a detector test. An accompanying picture shows Dr. Ruchhoft in action.

"Conditioning Water for Steam Production," by F. H. Long, Chemist, Wisconsin Electric Power Co., Milwaukee.

Mr. Long related experiences in water treatment in power generation in which zeolite softening had resulted in pitting corrected with ferrous hydroxide to absorb the dissolved oxygen and high alkali treatment. The latter causing turbine clogging was replaced by sodium phosphate. In the end the limits in boiler make up water proved to be a total alkalinity of 60 parts and pH of only 10.5 and 200 ppm. suspended iron added as ferrous hydroxide to absorb the free oxygen. To correct caustic embrittlement sodium sulphate treatment had been replaced by sodium phosphate, correcting tube corrosion at the same time. A dosage of 20 ppm. trisodium phosphate is employed, giving a phenolphthalein alkalinity of only 25 ppm.

At a central heating plant the make up water is lime—soda softened—and filtered through calcite sand. Magnesia precipitation reduces silica to 1 ppm. and effluent pH of 10.5 is adjusted automatically with 1% solution of sulphuric acid, the dosage being 15 ppm. H_2SO_4 to prevent deposits from the alkaline water.

Mr. Long recited experiences with carbonaceous zeolite softeners involving regeneration every 7 hours with 1¼% sulphuric acid solution and 1½ hours contact. The effluent from the softener, loaded with carbonic acid gas (pH of 3.7) passed through a degasifier (27 to 28 in. mercury-vacuum), comes out with less than 2 ppm. residual CO_2 and 2 cc/liter of oxygen. Traces of free mineral acid therein are automatically neutralized with sodium phosphate and slight excess to maintain

Veterans

Lew Heller
Supt. of Construction, Kenosha, Wis.
(31 years of Water Dept. service)

Ed. Brown
Water Works Supt., Eau Claire, Wis.
(Has been on the job 33 years and 23 years a member of A.W.W.A.)

a ratio of caustic to silica of 2 to 1 to reduce turbine deposits by holding silica in solution as sodium silicate.

"A Device for Locating Underground Waterworks Facilities," by Basil Miller, Supt. Water, Electricity and Sewerage, Fennimore, Wis.

For a complete description of the "Miller Pipe Locating Magnet" see *Water Works and Sewerage* for September 1943, page 335. Mr. Miller staged a demonstration, using his electro-magnet, operated from storage battery of a truck or automobile, for placing a quick magnetic charge through earth, concrete, etc., on hidden pipe lines, cables, valve boxes, etc., after which the dipping needle responds without any indefiniteness in spotting or tracing metallic objects, including mains, service lines, valve boxes, pipes in walls or floors, reinforcing steel, etc. The usefulness of this tool is its ability to highly magnetize the hidden metal which holds its charge while being located and traced with the simple dipping needle (compass) that ordinarily may respond very feebly to the buried object sought and frequently is distracted by non-sought metallic objects in the vicinity.

"Relationship of Regional Utilities Control Offices to Water Utilities and Washington Office of War Utilities," by A. L. Wallace, Regional Utilities Engr., and W. Fred Stevens, Sr., Engineer, Inventories Control Branch, WPB, Chicago.

Assisted materially by Lloyd Nelson from the Washington Office of War Utilities, in clarification of many questions in the minds of water works operators, Messrs. Wallace and Stevens made the following points in answering questions from the floor. Utilities needing materials or equipment in a hurry or in an actual emergency should communicate immediately with the nearest Regional Office of OWU, where surplus inventory records are available as well as lists of materials and equipment which can be purchased from another utility supplied proper priority.

In the case of a wish to make a main extension where there may be some question of exact authority as given in the U-1 Order it will be best to file a request for authorization with the Regional Office who will act on it or refer to the Washington office. Sufficient details should accompany such applications and reasons given for any special consideration thought warranted. Many such requests receive favorable action since there has been an easing in the cast-iron and Transite pipe situation. The bottle-neck is steel pipe for the service branch, and where small diameter cast-iron can be used the problem is much simplified all around. A much longer extension can be had where cast-iron is used rather than steel pipe of

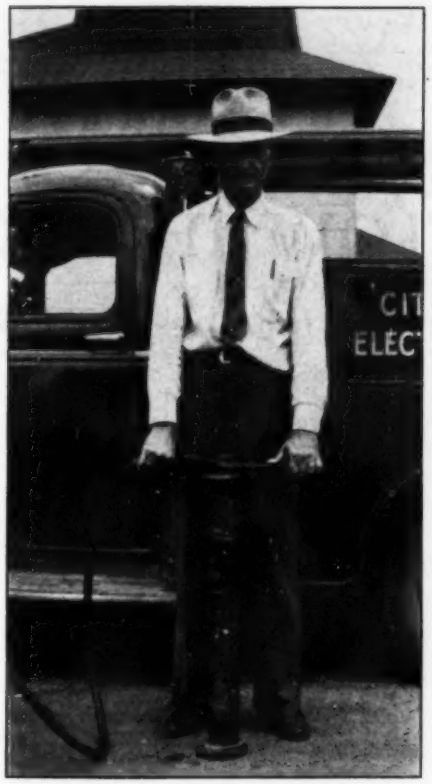
J. W. Myers, Supt. of Water, Kenosha — *W. H. Carey, Reg. Engr., O.C.D., Chicago* — *Paul Hansen, Consulting Engr., Chicago* — *Fred Stevens, Inv. Engr., W.P.B., Chicago* — *Geo. Martin, Supt. Wat. & Sew., Green Bay*

even smaller diameter. Much of the small diameter cement lined cast-iron pipe now going into the ground will probably never be replaced, although it may be paralleled in part by larger pipe at some future time.

In rounding out the question of when to proceed through the Regional Offices of WPB and when to appeal to the Washington office of OWU (Water Division) it was clearly stated that: (1) The U-1 order should be carefully studied and *only* those authorizations *not* automatically given water utilities in this very inclusive order covering all but exceptional maintenance, operation, repairs and extensions should be requested from any office of WPB. (2) In general the Regional Offices should be contacted on all but those applications requiring form WPB 2774 covering new construction. In the latter cases the application should be filed directly with the Water Division OWU in Washington.

[Since this meeting the Water Division of WPB has been reorganized on a regional basis with Regional Engineers, which facilitates operations with and through Regional Offices to decentralize and expedite the handling of applications on special cases and interpretations. —*Ed.*]

Mr. Nelson also explained "The Stop Waste Plan for Water Utilities," which is being fostered by the WPB and other Washington agencies, and vigorously promoted by A.W.W.A.



Inventor Miller and His Pipe Locating Magnet

Other Papers Presented

It is regretted that this reporter, being unable to remain for the closing half-day session, due to conflict with the conference of the Sewage Works Federation, is unable to report on the following papers presented in the closing session. Since lack of paper is the 1944 bottle-neck in the path of doing what an editor might wish, it is perhaps just as well that his record of the final session consists of the following titles from the program page of the Joint Session — A.W.W.A. and Engineering Society of Wisconsin.

"Electronics at Work"—(A Movie) By Westinghouse.

"Post War Planning for Public Works"
Henry Traxler, City Engr., Janesville, Wis.

"The Blue-Print Now Program"
E. L. Filby, Field Director, Joint Committee on Water and Sewage Works Development, N. Y. City.

"Engineering in Water Works Practice"
Paul Hansen, Consulting Engr., Chicago.

"Water Supply System of the Badger Ordnance Plant"
Wayne Bryan, Operating Engr., Merrimack, Wis.

Milwaukee in June

It appeared to this reporter that in the handling of the Joint Meeting of the Wisconsin Section and Engineering Society, Jos. Schwada and Herb. Brown, Supt. of Water for Milwaukee, were just getting their hand in for the handling of the National A.W.W.A. convention in June in Milwaukee. In any event a good sample of what to expect in June was handed out.

Congratulations to Messrs. Thompson and Lang

(We, Too, Are Pleased!)

A letter from Van P. Enloe, Secy.-Treas. of the Georgia Water and Sewage Assoc., elicits from us congratulations to two members of that Association. It also brings pleasure to us.

The letter follows: "Dear Sir: An Award for meritorious service in the field of water and sewage treatment was given to Sgt. Earl Thompson, 4th Service Command, Laboratory, Fort McPherson, Ga., and Mr. J. T. Laney, Filter Plant Operator, City Water Department, Athens, Ga.

"With this award goes a one year subscription to a Journal of Water or Sewage. Both of these men have expressed a desire to have subscriptions to your magazine. — WATER WORKS AND SEWERAGE.

"Please enter their names as subscribers for one year and bill the Georgia Water and Sewage Association." Signed, Van P. Enloe, Secy.-Treas.

U. S. Public Health Service Reorganizes

In accordance with a recent law enacted by Congress, the U. S. Public Health Service is to be reorganized and the place of the engineer in public health and sanitation is to be recognized. In the Office of the Surgeon General will be a Division of Sanitary Engineering, the chief of which will be a commissioned Sanitary Engineer with the grade, pay, and allowance of Assistant Surgeon General.

In addition to the Office of Surgeon General, the USPHS will consist of the National Institute of Health, the Bureau of Medical Services, and Bureau of State Services.

Long Island Section Holds Annual Meeting

The annual meeting of the L. I. Section of the N. Y. State Sewage Works Ass'n was held on December 10 at Freeport, L. I. Preceding the meeting was an inspection of the Freeport Sewage Treatment Plant, which was described at the dinner by Weston Gavett, Consulting Engineer, who told of some of the more recent additions to the plant, including a magnetite filter and sludge incinerator.

Henry Rath of New York, and Arthur Dawson, Greenport, L. I., were elected section directors, and C. George Andersen was reelected Secy.-Treas. Mr. Andersen read the paper on post-war planning which was to have been presented by Morris Cohn of Schenectady, unable to attend on account of illness.

WATER FLOW THROUGH PIPES

A Nomograph for Solving the Hazen-Williams Formula

By DONALD R. KEITH
Civil Eng'r
DIVISION OF WATER
COLUMBUS, OHIO

MANY hand-books containing hydraulic data include tables for solution of the Hazen-Williams formula for flow of water in pipes. These tables are limited in their scope and give results for "V" only. Then you either figure "Q" from "V", or find some other table which shows these values.

Even with the tables it is necessary to do a certain amount of calculation, such as interpolation, etc., for seldom does your problem fit the figures in the table.

Some books contain curve charts for the solution of this formula, but only for "V". The curve charts are usually of such small scale that they are tedious to use, and will not give results close enough for practical purposes since the width of a pencil point might make a very definite difference in the value of "V".

To provide a practical device for the solution of pipe discharge problems continually confronting the Division of Water and the Sewage Department of Columbus that the accompanying chart was constructed. A chart that would be accurate enough for all practical purposes and one simple enough in its operation that an individual of average intelligence could use it, and furthermore, one comprehensive enough to solve every problem that had to do with the flow of water in pipes.

The Hazen-Williams formula was selected for the reason that it seems to be more generally used and accepted than any other.

To the main formula,

$$V = CR^{0.63} S^{0.54}\ 0.001^{-0.04}$$

was added,

$$Q = AV = 4\pi R^2 V$$

in which V = Velocity, R = Hydraulic Radius, S = Slope, or loss of head, Q = Discharge, A = Area of Section, and C = Coefficient, depending upon material and condition of inner surface of pipe.

In laying out the R-scale, it was immediately seen that the operation of chart would be simplified by adding the pipe diameter-in-inches-scale to the opposite side of the line by the formula R=D/4.

The Q-scale was first laid off for discharge in cubic feet per second, then to simplify, a scale showing discharge in gallons per minute was added to the opposite side of line.

The scale-modulus for the R and S-scales is 8, that is to say, the logarithmic cycle for each of these scales would equal that of an 8" slide rule, in the original size of chart as constructed; in the C-scale the cycle is 6.84"; the V-scale, 3.42"; and the Q-scale, 1.844".

The S-scale is graduated in decimals of one foot to the lineal foot. In problems involving loss of head, such as one foot loss of head in a thousand lineal feet, you would use the point 0.001 on the S-scale, and move the decimal period three places to the right (1.00). The S-scale is used for slope, loss of head, and pressure head expressed in feet.

Values of "C" of course depend upon the material and condition of inner surface of pipe as noted on the accompanying chart. Tables showing values of "C" for various kinds of pipe old and new, may be found in any hand-book of pipe data. For convenience of the user of the chart three valves are listed in the accompanying table.*

"Hazen-Williams Table of Values for 'C.'"

Cast Iron Pipe, very smooth	140 to 145
" " " new, good condition	125 to 135
" " " old, good condition	100 to 125
" " " old, bad condition	60 to 100
Steel Pipe, riveted new	105 to 115
" " riveted old	90 to 105
Masonry Conduits	110 to 135
Brass, block tin, lead, glass	140 to 150

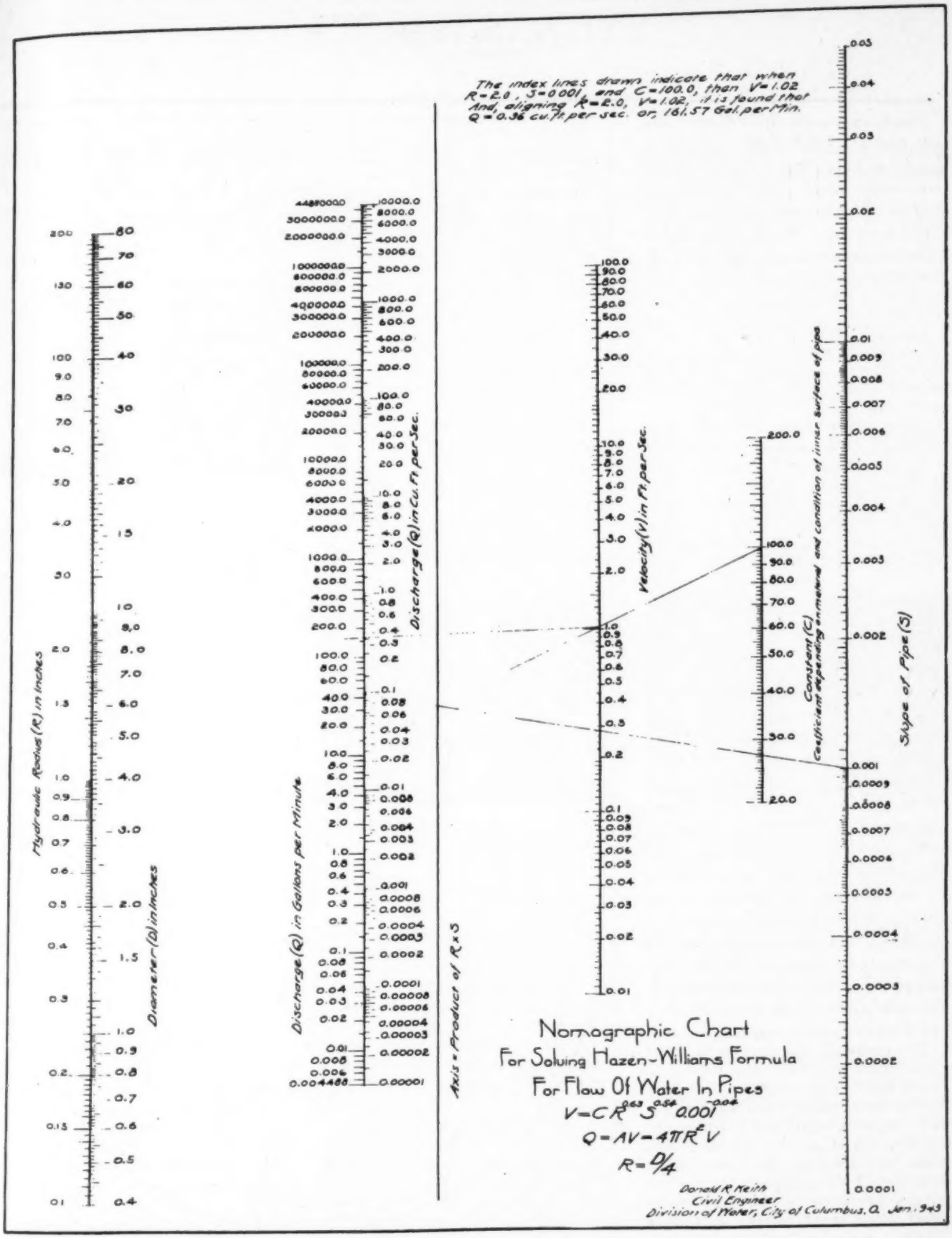

The index lines drawn indicate that when R = 2.0, S = 0.001, and C = 100.0, then V = 1.02
And, aligning R = 2.0, V = 1.02, it is found that
Q = 0.36 cu. ft. per sec. or, 161.57 Gal. per Min.
Hydraulic Radius (R) in Inches
Diameter (D) in Inches
Discharge (Q) in Gallons per Minute
Discharge (Q) in Cu. Ft. per Sec.
Velocity (V) in Ft. per Sec.
Constant (C) Coefficient depending on material and condition of inner surface of pipe
Slope of Pipe (S)
Axis = Product of R x S
Nomographic Chart
For Solving Hazen-Williams Formula
For Flow Of Water In Pipes
$V = C R^{.63} S^{.54} 0.001^{.04}$
$Q = AV = 4\pi R^2 V$
$R = D/4$
Donald R. Keith
Civil Engineer
Division of Water, City of Columbus, O. Jan. 1943

Chart for Solving Hazen-Williams Formula for Flow of Water Through Pipes.

A TIME SAVING CALCULATOR

By V. W. PALEN*
PITTSBURGH, PA.

Plant engineers and electricians will find a KVA-KW-HP Calculator a very useful gadget to have on hand—it saves much time in making routine calculations involving electrical capacities. It solves single and three-phase problems expressed by the following formulae:

Single Phase

$$\text{Kva} = \frac{\text{Volts} \times \text{Amps}}{1000}$$

$$\text{Kw} = \frac{\text{Volts} \times \text{Amps} \times \text{P.F.}}{1000}$$

$$\text{Hp} = \frac{\text{Volts} \times \text{Amps} \times \text{P.F.}}{746}$$

Three Phase

$$\text{Kva} = \frac{\sqrt{3}\ \text{Volts} \times \text{Amps}}{1000}$$

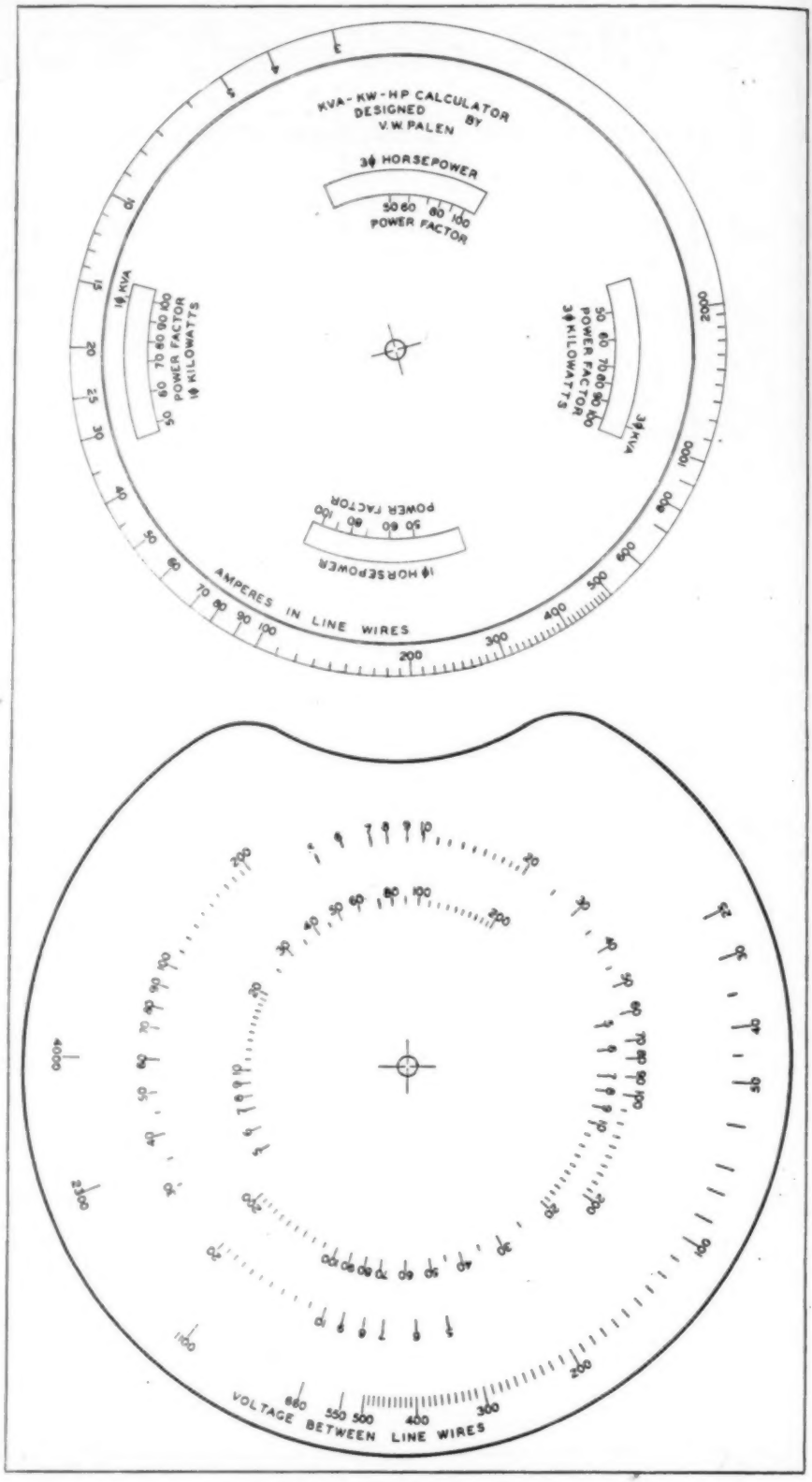
$$\text{Kw} = \frac{\sqrt{3}\ \text{Volts} \times \text{Amps} \times \text{P.F.}}{1000}$$

$$\text{Hp} = \frac{\sqrt{3}\ \text{Volts} \times \text{Amps} \times \text{P.F.}}{746}$$

The range of the calculator 5 to 200 (Kva, Kw or Hp, as the case may be) can be extended easily to cover a range of 50 to 2000 merely by multiplying all values by 10. It can be used to find Kva, Kw or Hp from known values of amps and volts; similarly it will determine amps for given values of voltage, Kva, Kw and Hp. Thus, knowing the size motor to be installed, an electrician can quickly determine amps—from this he knows what size wire to use for the circuit. Conversely, having read amps at transformer terminals—the calculator tells what load, in Kva, the transformer is carrying.

To assemble, cut out both discs (also small windows) and mount on cardboard with rubber cement. Punch the center holes carefully—then insert a small brass bolt in the holes. Washers, if used will save wear and tear on the paper. The bolt should be tightened to give the proper pressure on the discs—they must hold their setting, yet turn easily. A drop of solder applied to the nut will make the assembly permanent.

*Editorial Service—Westinghouse Elec. & Mfg. Co.



KVA-KW-HP Calculator

[NOTE: *If a photograph is made of this cut on heavy glossy paper it can be worked with much more easily in making the calculator. And extra prints may be made from the negative as required.*—EDITOR.]

N. J. SECT. AWWA MEETING IN ATLANTIC CITY

A Report

By GEORGE E. SYMONS
Assoc. Editor

CLIMAXING the year's meetings of the N. J. Section in 1943 was the Nov. 4, 5, and 6 meeting in Atlantic City, held in conjunction with the South Jersey Water Superintendents. Except for a downpour of rain one night the meeting was a success both from an entertainment point of view and from the viewpoint of the serious minded who came only to hear the scheduled papers. Registration was brisk on the evening preceding the meeting. Many of those attending indulged themselves in lobster or other sea food at the famous Hackneys Restaurant on the Board Walk.

Chairmen

N. J. Sect.
Wm. G. Banks
Div. Engr.
Newark, N. J.

Water Supts. Ass'n
Wm. E. Collings
Supt. Water
Borough of Collingswood

For those whose interest was primarily in the technical program there was a variety that ran from a brisk discussion of the new U. S. Public Health Drinking Water Standards, through "Heavy Rainfall," the conservation program, leakage surveys, and Blueprint Now, to a very interesting presentation of "House Organs" by the Editor of "Water."

Scott Bills Disapproved

In a very short but effective business meeting the Scott Bills in the N. J. Legislature were severely criticized and a resolution by Prof. Harry N. Lendall, Head of the Civ. Engr. Dept. of Rutgers University, was adopted, disapproving these bills.

Of these five bills dealing with the question of water supply one proposes to set up an overall control commission with complete jurisdiction over the water supplies and the powers to operate these supplies.

W. R. Conard, Cons., Burlington, proposed that a copy of the resolution be sent to each member of the State Senate with a letter stating that the N. J. Section represented practically all of the public and private water supplies in the state. This proposal was unanimously adopted.

U.S.P.H.S. Drinking Water Standards

As in many other sections of AWWA this meeting produced some considerable comment on the new drinking water standards. Peter Pallo, Asst. San. Engr., Hackensack Water Co., gave an interesting review of the historical background of drinking water standards, quoting from observers as far back as of the seventeenth century.

Paul Tamer, Chief Chemist, Hackensack Water Co., pointed out in his paper how water quality had generally been improved following the adoption of water standards, and quoted statistics on the typhoid death rates to prove his thesis. Mr. Tamer suggested that a simpler and quicker method for determining the pollution of water was highly desirable.

Secretaries

N. J. Sect.
C. B. Tygert
Dist. Mgr.
W. & T. Co.
Newark

Supts. Ass'n
Walt. Spencer
Merchantville, N. J.

George Norcom, Cons. Engr. and Chem., Red Bank, N. J., and Lee T. Purcell, Analyst, No. Jersey Dist. Water Supply Comm. Wanaque, followed with some practical suggestions regarding the standards and their application. Mr. Norcom commented on some of the difficulties of meeting the new techniques of sample collection and analysis, and Mr. Purcell said that the standards were a goal at which to shoot, and toward which plants were gradually working.

Unusual Rainfall

"And then it rained and when it was through it rained some more." It wasn't forty days and nights but on July 16-17, 1942, near Ridgeway, Penn., there was a rainstorm known as Type 5. Mr. James E. Stewart, Hydraulic Engineer, West Penn Power Co., Pittsburgh, Pa., showed the map of the area of this storm and gave a resume of the records that were collected. With precipitation amounting to 18 inches in 3 hours, more than thirty inches in some places, and rates up to 39 inches per hour for ten minute periods, it was easy to understand the large amount of damage done. This was the storm which affected the area around Olean, N. Y., where severe damage to water mains and supply was partially offset by the efficient operation of Mutual Aid.

Headliners

Sam F. Newkirk
Engr. & Supt.
Elizabeth, N. J.
(V. Pres., AWWA)

H. Loyd Nelson
U. S. Cast Iron Pipe
Philadelphia
(Prin. Engr. OWU)

Blueprint Now and the Conservation Program

H. Lloyd Nelson, Eastern Mgr. of the U.S. Cast Iron Pipe Co. of Philadelphia, and Prin. Engr. of the Water Div. OWU; Sam Newkirk, Engr. and Supt., Bd. Water Comm. Elizabeth, N. J., and Vice Pres. AWWA; and Phillip B. Niles, Director of Personnel of the Am. Water Works and Electric Co. and member of the National Conservation Committee; separately and together brought to the meeting the story of the need for conservation

of power, light and fuel during this war, and of the advantages of blueprinting now for future development of water supply. It was emphasized that the conservation program for water, so ably presented in AWWA's booklet of recent issue, does not con-

Programmers

P. B. Niles
Personnel Div.
Am. W. W. & E. Co.
N. Y. City

H. T. Critchlow
Chief Engr.
N. J. Water Comm.
Trenton, N. J.

template denial of sufficient water for all normal uses. It merely proposes to save power, and fuel by *preventing water waste.*

Does the Team Know the Score?

Under this intriguing title Miss E. McDonnell, Editor of "Water," employee magazine of the Am. Water Works and Electric Co., gave a most interesting talk on how to prepare employee magazines, what to put in them, how often to publish, how to obtain material, what not to publish and the benefits to be derived from such publications.

In the case of the Am. Water Works and Elect. Co. every employee of the seventy-five companies and plants receives a copy of the magazine. Miss McDonnell warned against writing about controversial subjects, politics or political figures, and personal humor at the expense of the individual. Copy should be limited, should contain no inuendo about personnel, and should not preach. The editor of such a paper should in no way attempt to "write down to the reader." It was suggested that a mimeographed paper could be put out for a group as small as ten employees. Regardless of the size of the company, and regardless of whether public or private water supply, these house organs serve to produce a common ground where employer or supervisor and employee can meet and express ideas of mutual benefit.

Leakage Surveys

A paper by Russell C. Smalley, Supt., Highland Park, N. J., Water Dept., and a round table discussion covered this subject from the viewpoint of two different methods of making the surveys. Mr. Smalley recounted the experiences of Highland Park where five surveys have been made since 1928 with a saving of 140,000 gal. per day per survey or 19 per cent of the water consumption. This is important to that city inasmuch as it purchases water from another supply and pays on a master meter reading. Wastage is costly. Total saving from these leak surveys has amounted to $49,000. Cost of surveys averaged $7700 each.

Sam Newkirk gave some pertinent suggestions to help combat leakage; he suggests that meter readers listen at meters that repairmen and meter readers should listen at fire hydrants, and that every three months a calculation should be made to determine how much of the water produced was accounted for. Mr. Newkirk, who has one of the lowest unaccounted for water percentages in the country makes a check of the figure each month.

Mr. S. F. Ferguson of Newark described the leak detector which his company produces and explained its workings. Operating on the principle of audio frequency and employing a Rochelle Salt Crystal Detector, this device will locate leaks without the need for introducing measuring devices and without the need for shutting off any sections of the distribution system. It is claimed that the radio frequency of a leak varies with the type of main and such information must be known in order to properly utilize the instrument. When the electronic tubes are tuned to the water leak frequency it is possible to locate the leak if the water pressure is more than 25psi, and one man can cover 150-175 hydrants a day.

Maj. Tom Riddick, USPHS (until recently a Cons. Engr. and Chem. of New York City), told of telemetering devices at Nyack, N. Y., which after installation at the reservoir showed a leak loss of 38 per cent of the water furnished that village. He wanted to know if it is possible to locate leakage of such high percentage magnitude but low volume per minute over a fairly large area.

Round Table on Water Dept. Auxiliaries

Led by H. T. Critchlow, Chief Engr. New Jersey State Water Policy Commission, and sparked by Russell Rikere, Engr. Princeton, N. J., a round table discussion of "Water Auxiliaries for Emergency," filled the latter part of the Friday afternoon session. The mutual aid program was further discussed by Major John F. Brewster and by Major T. M. Riddick who has been appointed to cover N. J. in a program of the USPHS to develop a program of protection of water facilities against sabotage, especially where such supplies are vital to the war industry effort. In collaboration with the state engineer a new survey of all plants is to be made in the state.

(1) (2) (3) (4) (5)

Among Those Present

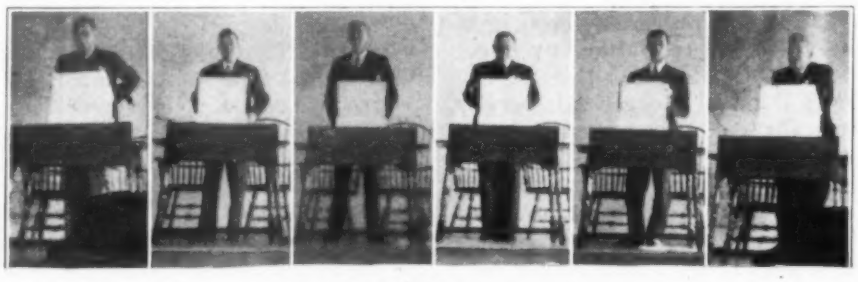
(1) *James E. Stewart Hydraulic Engr. West Pen Power Co. Pittsburgh, Pa.*

(2) *Lee T. Purcell Analyst No. Jersey Water Dist. Wanaque, N. J.*

(3) *A. F. Eschenfelder Boro Engr. Glen Ridge, N. J.*

(4) *Peter Pallo Asst. San. Engr. Hackensack Water Co. New Milford, N. J.*

(5) *James H. Allen Chief Engr. INCODEL Philadelphia*



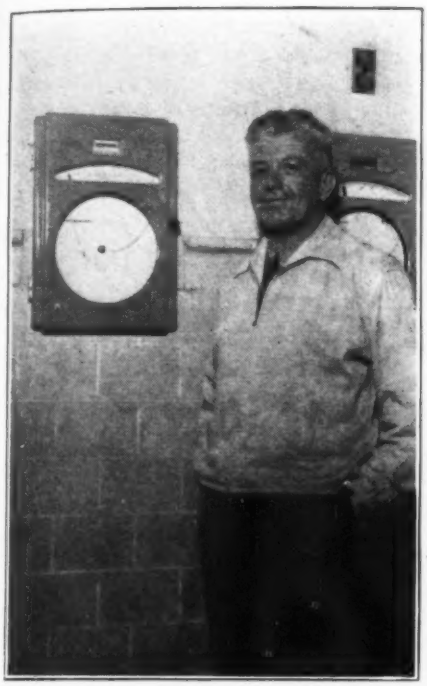
Speakers' Platform

Niles, Purcell, Norcom, Stewart, Pallo, Nelson

A "VICTORY MODEL" METER CHAMBER

As Constructed at the Joint Sewage Treatment Plant of Rutherford, East Rutherford, and Carlstadt, N. J.

By ALBERT B. KOZMA
Superintendent
SEWAGE TREATMENT WORKS*
RUTHERFORD, N. J.



The Author
and "Chronoflo" Totalizer-Indicator Recorder Instrument

THE Joint Meeting sewage treatment plant, located at Rutherford, N. J., serves three municipalities, Rutherford, East Rutherford, and Carlstadt. The cost of operation is charged to these three municipalities according to their flows. Therefore, the reliable metering of the contributed flow from each community is essential.

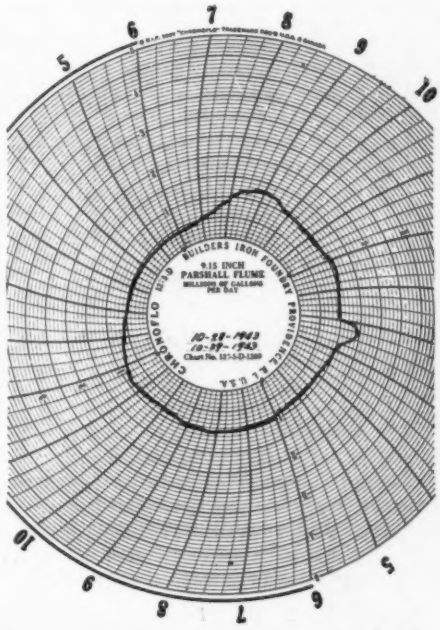
The original plans called for a master meter at the plant, three meters on the various trunk lines from Carlstadt, and one meter for the combined flows from East Rutherford and Carlstadt. The flow from East Rutherford is computed by deducting the total of the readings of the first three meters from the fourth, and Rutherford's sewage is obtained by deducting the quantities measured at the fourth meter from the master meter readings. In so doing, however, the flows recirculated within the plant are included in the master meter readings, and they have to be estimated and deducted to receive the net flows chargeable to Rutherford.

This procedure was not acceptable to Rutherford and they asked the Joint Meeting to install a separate meter for them.

Design of New Meter

The new meter was to be located in front of the administration building of the treatment plant, on the 24-in. trunk line coming from Rutherford (see fig. 1, Location Plan). It so happens that at this point the flat grade of the trunk line changes to an almost 45 deg. slope. This fact is mentioned because it had an important bearing on the later developments.

The first plan called for a standard 10 ft. long by 8 ft. wide concrete chamber in place of the existing manhole to house an "Impact Flume" type meter. The estimated cost of this project was $4,000 which subsequently proved to be too low: the bids received in April 1942 increased the final cost to $7,500.



Representative "Chronoflo" Recorder Chart for 9.15 Inch Parshall Flume

The War Production Board granted an A-10 priority for this project but it soon became apparent that this priority did not suffice to obtain all the materials and it was decided to authorize the writer to work out a simplified design.

Substitute Design

Because of the change in gradient at the contemplated location it was possible to utilize the existing manhole as a meter chamber and to build in its bottom a Parshall Flume, housing the transmitting equipment in it. (See fig. 1, Section A-A and Plan.) The receiving equipment

*Serving the Joint Meeting of Rutherford, East Rutherford and Carlstadt, N. J.

TABLE 1.
Dimensions and capacities of the Parshall measuring flume for various throat widths, W.
(*Letters refer to dimensions, fig. 2*)

W		A		⅔A		B		C		D		E		F	G	K	N	Free Flow capacity Max.	Free Flow capacity Min.
Ft.	In.	Ft.	In.	Ft	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.	Ft.	Ft.	In.	In.	Sec. ft.	Sec. ft.
0	3	1	6⅜	1	0¼	1	6	0	7	0	10⅞	1	4	½	1	1	2¼	1.1	0.03
0	6	2	0⅞	1	4⅝	2	0	1	3⅝	1	3⅞	2	0	1	2	3	4½	3.9	0.05
0	9	2	10⅝	1	11⅛	2	10	1	3	1	10⅝	2	6	1	1½	3	4½	8.8	0.09
1	0	4	6	3	0	4	4⅞	2	0	2	9¼	3	0	2	3	3	9	16.1	0.35
1	6	4	9	3	2	4	7⅞	2	6	3	4⅜	3	0	2	3	3	9	24.6	0.51
2	0	5	0	3	4	4	10⅞	3	0	3	11½	3	0	2	3	3	9	33.1	0.66
3	0	5	6	3	8	5	4¾	4	0	5	1⅞	3	0	2	3	3	9	50.4	0.97
4	0	6	0	4	0	5	10⅝	5	0	6	4¼	3	0	2	3	3	9	67.9	1.26
6	0	7	0	4	8	6	10⅜	7	0	8	9	3	0	2	3	3	9	103.5	2.63
8	0	8	0	5	4	7	10⅛	9	0	11	1¾	3	0	2	3	3	9	139.5	4.62

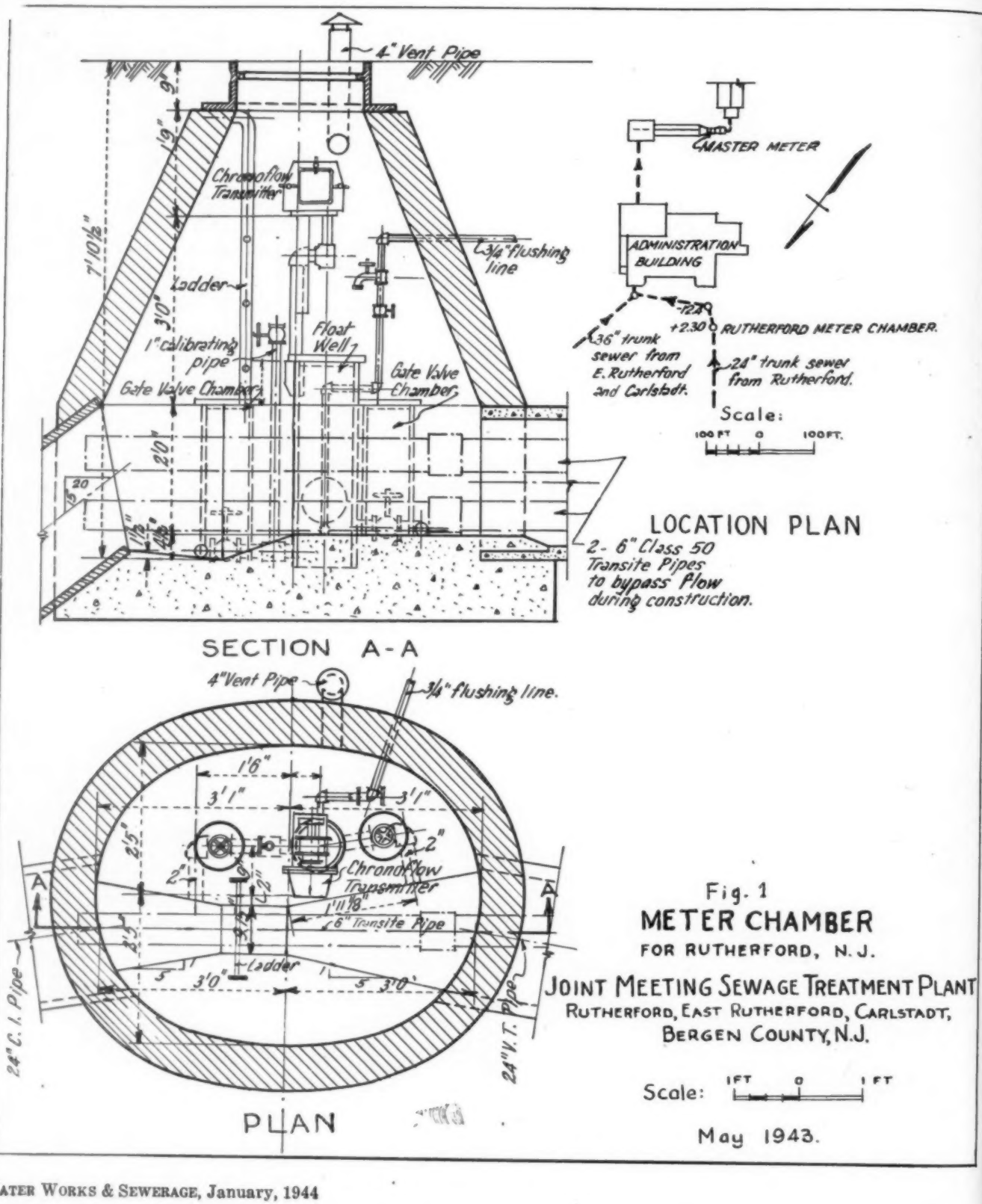
with the indicator, totalizer and chart was to be located in the Administration Building.

The dimensions of the Parshall Flume were obtained from Farmer's Bulletin No. 1683 issued by the Department of Agriculture. Fig. 2 and Table I show the dimensions of the various units.

A 9-in. throat width flume was selected with a maximum free flow capacity of 8.8. cu. ft. per second. With the aid of the tables in this pamphlet we checked the hydraulics of this installation and verified that "free flow" conditions will prevail.

A Chronoflo electric transmitter actuated by a single float, was purchased from Builders-Providence, Inc. The signals are transmitted to a Chronoflo Receiver Instrument. This receiver is combined with a totalizer, indicator and recorder mounted in a panel, showing total flow, indicating and recording the rate of flow.

In designing the meter chamber it was necessary to make certain that the cost of materials did not exceed $500. Within this sum we had the right to issue an AA-5 priority rating under Preferential Rating Order No. 46, subparagraph (5)



(ii), non-underground construction.

The final breakdown of the cost of the materials was as follows:

Chronoflo meter, by Builders-Providence, Inc.	$435.00
Electric wiring and conduits	30.00
Piping for water	14.00
Transite pipe for temporary bypass	16.00
Cement, sand, etc.	5.00
Total	$500.00

Construction of the Flume

Construction of the Parshall Flume in the bottom of the manhole was commenced around the middle of February, 1943, under adverse weather conditions and it was completed in three weeks. Two 6-in. class 50 transite pipes were used for bypassing the flow. Inexperienced personnel, lack of construction equipment and leaks in the manhole walls presented some of the difficulties which, however, were overcome.

After removing the forms we found that the actual width of the throat was 9.15" instead of 9" and the meter was calibrated accordingly. The transmitting and receiving equipment was delivered in the early part of May and in a few days later the meter was placed in operation.

All construction was carried out by our own personnel and the only cost was for overtime labor in the amount of $40.00.

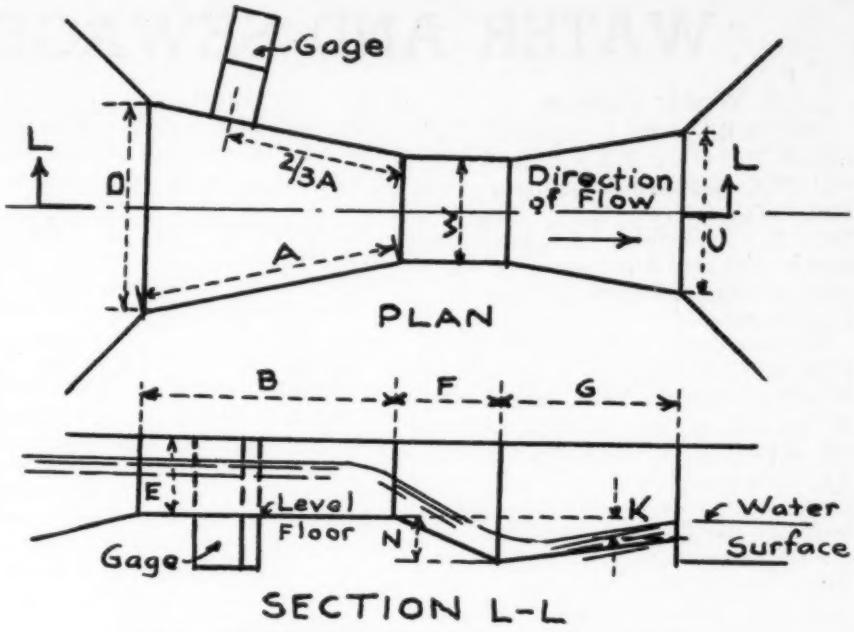


Fig. 2. Plan and Elevation of Parshall Measuring Flumes

Conclusions

Wartime conditions as a rule are not encouraging for any type of construction not directly contributing to the war effort. The rules and regulation of the War Production Board are liberal enough, however, to permit small additions and thereby encouraging simplifications of these small engineering operations.

In our case the result was a substantial saving and we feel that the equipment as installed will far outlast the war. If we find that the meter chamber should be enlarged we can do so without wasting any of the materials expended in this project.

Wilmington's New Filter Plant Dedicated

What is thought to be the most important water purification plant and pumping station of 1943 is that of Wilmington, N. C., which was dedicated on December 9th, and named in honor of Wilmington's longtime (50 yr.) Chief Plant Engineer, "Cap'n" John H. Sweeney, whose philosophy is best exemplified in a sign which he had placed above the water gages of the old plant boilers. The sign still hangs there, and says—"TRUST IN THE LORD, BUT ON YOUR OWN ACCOUNT KEEP TWO GAGES OF WATER IN THE BOILER."

Wilmington's water system dates back to 1881 and in 1906 the first rapid sand filters were installed, which were operated under supervision of the renowned George C. Whipple. Interestingly the water company owned the sewer system also and both were taken over by the new Water and Sewerage Commission of Wilmington in 1909.

The new Sweeney Filter Plant and Pumping Station is the result of a tremendous population influx into the Wilmington area as the result of war activity.

Operating Floor, Wilmington's New Filter Plant.

The present Superintendent of Water at Wilmington is one of North Carolina's No. 1 citizens—McKean Maffitt, who has served in this capacity for the past 26 years, whose Chief Plant Engineer is John H. Sweeney, Jr.

The new plant was designed and its construction supervised by Wm. C. Olsen, Consulting Engineer of Raleigh, N. C., who is preparing an article on this outstanding plant of 1943 for an early issue of WATER WORKS AND SEWERAGE.

WATER AND SEWAGE PATENTS

Water Patents

RECOVERY OF PHOSPHATE FROM PHOSPHATE BOILER SLUDGE. Edward W. Butzler (to Hall Laboratories). U. S. 2,330,865, Oct. 5. Treatment of phosphate sludge with acid and passage of solution through alkali-metal base exchange material.

APPARATUS AND METHOD FOR STERILIZING FLOWING WATER. Carl L. Trier and James H. Livingston, 3rd (to Cherry-Burrell Corp.). U. S. 2,331,518, Oct. 12. An injector system for adding sterilizing chemicals to water, particularly for use on bottle washers.

CENTRIFUGAL PUMP. Carl Blom (to Byron Jackson). U. S. 2,332,299, Oct. 12. Multistage centrifugal pump.

WATER TREATING METHOD. Melvin A. Enquist. U. S. 2,332,209, Oct. 19. Method for inhibiting corrosion of base metals in aqueous solutions by a water-soluble polyphosphate complex.

WATER FILTER. Frank P. Blair (one-half to Raymond C. Cook). U. S. 2,332,982, Oct. 26. Household filter with bypass arrangement.

SELF-PRIMING PUMP. Albert C. Stratton (to Alfred S. Marlow). U. S. 2,332,875, Oct. 26.

WATER SOFTENING PROCESS. A. S. Behrman. U. S. 2,333,142, Nov. 2. Cation exchange by passing water from one material in contact with a sulfonated rubber containing cations from another material.

FLOW INDICATING FLUID METER. George K. Porter (to Fischer-Porter Co.). U. S. 2,333,884, Nov. 9. A rotameter for measuring fluid flow.

TREATING WET SOLIDS. Teynham Woodward (to Westvaco Chlorine Products Corp.). U. S. 2,335,373, Nov. 30. A system for removing water from suspensions of clumped solids formed by chemical precipitation, by jarring action in an impact beater mill to disaggregate clumps and allow entrapped liquid to be filtered therefrom.

FILTER AND WATER PURIFIER. Frank Senyal. U. S. 2,335,458, Nov. 30. Filter and purifier for bottled water.

WATER SOFTENING APPARATUS. Eric W. Eweson (to Aqua-Electric Corp.). U. S. 2,335,657, Nov. 30. A utensil adapted to confine water softening material for the passage thereover of water to be softened.

RAKE AND CLEANER FOR FILTER BEDS. Charles E. Fraser. U. S. 2,335,749, Nov. 30. For downflow filter beds, a bed cleaner and rake with independent motors, both of which reverse the travel at each end of the filter.

AQUARIUM WATER CONDITIONING DEVICE. James F. Haldeman. U. S. 2,335,756, Nov. 30. Circulating aerating filters for aquariums. See also U. S. 2,276,428.

WELL TREATING FLUID. Leo C. Morgan and Troy J. Stewart (Stewart to Morgan) U. S. 2,335,689, Nov. 30. An acid capable of forming water soluble salts with the earth formation. Acid contains a polyhydroxy aromatic ferric iron sequestering agent to prevent precipitation of iron when acid is spent. Agent used to increase flow in encrusted wells.

WATER SOFTENING APPARATUS. Edward W. Welp (to Graver Tank and Mfg. Co.), U. S. 2,336,659, Dec. 14. A water softening tank with upward flow arrangement and adaptation of principle of water passage through precipitated floc.

SAND CLEANING AND CLASSIFYING APPARATUS. LeRoy F. Bush. U. S. 2,337,446, Dec. 21.

PROCESS OF RETARDING METAL CORROSION BY WATER. Owen Rice and George B. Hatch (to Hall Laboratories) U. S. 2,337,856, Dec. 28. Use of alkali metal meta-or polyphosphate, polyvalent metal meta, or polyphosphates and ammonium meta-or polyphosphates for protective film on submerged metal.

PIPE MARKING AND CUTTING GAUGE. Jake Akins (½ to A. A. Dorman) U. S. 2,337,957, Dec. 28.

AIR CHAMBER FOR WATER SERVICE LINES, David E. Anderson, U. S. 2,337,959, Dec. 28.

Sewage Patents

DIGESTION OF SEWAGE SOLIDS. Adolph Lawrie Kurtz (to Chain Belt Co.). U. S. 2,331,031, Oct. 5. A covered tank divided into compartments for stage digestion, with provision for transfer of sludge and gas collection.

SEWAGE DISTRIBUTOR. Albert B. Hodges (to Infilco). U. S. 2,333,177, Nov. 2. Rotating distributing arm with multiple discharge orifices for trickling filter bed.

WASTE TREATMENT FROM PAPER-MAKING PROCESS. Robt. B. Booth (to Chemical Construction Corp.). U. S. 2,335,209, Nov. 23. A flotation process employing an ammonium soap of talloel as a flotation agent and removing waste solids which are concentrated in the froth.

CLARIFYING LIQUIDS. George E. Henkel (to American Centrifugal Corp.). U. S. 2,334,703, Nov. 23. Method of clarification by flotation accompanied by continuous removal of floated accumulation.

SLUDGE DIGESTER. Frank A. Downes (to The Dorr Co.). U. S. 2,335,562, Nov. 30. A biologic sludge-digesting tank unit with horizontal tray intermediate between top and bottom, providing an upper primary digestion compartment and a lower secondary digestion compartment. Means are provided for transferring sludge, removing supernatant liquor and collection and removal of gas from both compartments.

BAR SCREEN CLEANING MECHANISM. Charles H. Scott (to The Dorr Co.). U. S. 2,335,573, Nov. 30. A mechanical rake for bar screens, with method of cleaning accumulations on the rake, and returning the rake to the bottom of the screen.

THROUGH-FLOW COMMINUTOR, Corson W. Chase (to Chicago Pump Co.) U. S. 2,336,069, Dec. 7. A screening element rotatable with spaced discs to form slats with means to rotate the screen for the purpose of comminuting solids.

GREASE TRAP. Elmore B. Marple, U. S. 2,337,203, Dec. 21. A multiple compartment trap, with baskets for removing separated grease.

ACTIVATED SLUDGE PROCESS EQUIPMENT. Richard H. Gould, U. S. 2,337,384, Dec. 21. Design for distributed input of sewage to aeration tanks.

SEWAGE TREATMENT METHOD AND APPARATUS. Paul M. Thayer, U. S. 2,337,507, Dec. 21. In the activated sludge process a method and equipment for settling the sludge from the aeration tank and classifying the settled sludge by gravity, returning the lighter part of the settled sludge to the aeration tank and disposing heavy part of sludge.

SCUM REMOVER. Frank G. Stuller (to Chain Belt Co.), U. S. 3,447,859, Dec. 28. A special conduit located across one end of a sedimentation chamber to receive and remove scum collecting in the chamber.

VENTURI METER. Gregory A. Petroe (to Mathieson Alkali Works), U. S. 2,337,921, Dec. 28. A venturi meter for measuring the flow of liquids carrying suspended solids.

OBJECTIVES IN THE PROGRAMMING OF POST-WAR SANITATION WORKS*

By EARNEST BOYCE
Senior Sanitary Engineer (R)
U. S. PUBLIC HEALTH SERVICE

IT IS proper that there should be concern regarding the problems of the post-war period and that attempts be made to analyze the conditions that can give rise to emergency situations—and to find, in advance, solutions for them.

Past experience has indicated the value of a public works construction program as a means of providing employment during a period of economic depression. It is therefore logical that our plans for the future should have incorporated in them proposals for the use of this method of employment stabilization. It is easy to classify long lists of needed public works and to envision the material changes that can be brought about by their construction. It is not so easy to appreciate that material change alone will not make this nation strong or its people happy.

There is a need in the planning of our post-war procedures to go deeper than the mere providing of bread alone. We need to recognize that, unless in our planning we keep alive the essentials of true democracy, in spirit our nation can starve in the midst of material plenty. Certain basic principles are essential to the continued vigor of our democracy and in our planning for the post-war period it is important that we recognize these principles and thus establish better the very foundation of our government.

The Strength of Democracy

One of these fundamental principles that gives strength to our democracy is the recognition it gives to the freedom of the individual citizen to join with his fellows in the formulation of such governmental policies as may be acceptable to the majority of the group.

There are many would-be Aladdins who long for a magic lamp to conjure up the objects of their wishful thinking and who envision a post-war world, limited by their conception of what that world should be. Unconfessed dictators at heart, they would impose their particular pattern of perfection by fiat act. Material progress can, and in emergency sometimes must be made in this way, but the principle is foreign to the spirit of the cause for which we fight.

The Author

Any progress that is made without full recognition of the essential need for an informed and responsible electorate will be based on the shifting sands of political expediency without adding to the stability of a free government of the people. The freedom to make mistakes is equally essential to the spiritual growth of an individual and to the civic development of a town or city. This freedom is also essential to the vitality of our democracy. Mistakes must be eliminated, not by removing the freedom of individual or group action but rather by the slower process of educating the majority. Real governmental leadership will have been achieved when, through the advantage of careful, economic, social, and engineering analysis, factual information will make it possible for an informed electorate to assume its proper civic responsibility.

Essential Objective of Post-war Sanitation Work

The programming of post-war sanitation works will have missed an essential objective if there is a failure between the planning and construction stages to develop a local interest in and civic responsibility for the proposed improvements.

Because of national emergencies, first economic and then military, it has been necessary to expedite construction programs through administrative procedures that have emphasized the speedy attainment of essential national objectives. The immediate success of these procedures in meeting emergency situations makes an appeal to those who are thus relieved of local responsibility.

Should emergency measures that do not require a mature civic response on the part of the majority become permanent, it is inevitable that there will be a loss of civic interest that can lead to an eventual loss of civic liberty. As citizens of a democracy, we must respond to the trust that this form of government places with us and face civic responsibility free of the immaturity of wishful thinking—or we will not be worthy of or long retain the freedom we now enjoy.

There are those who have questioned the ability of a democracy to meet emergency problems without resorting to the direct action procedure of the dictator. The fallacy of their reasoning lies in the failure to recognize our freedom to anticipate emergencies—and by planning their solution in advance to remove the emergency character of their occurrences.

Problems of Post-war Reorganization

The problems of post-war reorganization will retain their emergency character only to the extent that we fail now to anticipate them. This nation can ill afford the social and economic loss that must come if we leave to emergency salvage measures the conservation of the most valuable of all national resources—

*Presented before the Engineering Section, American Public Health Association, meeting in New York City.

the proper utilization of its manpower.

The encouragement of local civic interest in public affairs, including public works, is so essential that the development of governmental procedures which will not only promote but will require this interest may well be a basic objective in programming post-war sanitation works. This will require an integration of the functions of local, State, and Federal governments in the planning and development of public works in order to accomplish the program without a usurpation of responsibilities that should remain with local government, on the one hand, and an uncoordinated effort that would fail to provide a maximum national benefit, on the other.

A second major objective in the programming of post-war sanitation works may well be the development of procedures that will encourage the planning of projects sufficiently ahead of the construction period and in such detail as to permit a thorough understanding of the objectives to be attained. The development of a proper civic interest in proposed public works requires that there be a time interval between the design and the construction stage of a project to permit an educational presentation to the public of the need for the project.

Value of Basic Engineering Data

There should be a more general public appreciation and acceptance of the value of basic engineering data in the design of public works and of the time required for the development of the proper design. Back of every properly designed engineering project there must be a well defined objective—it is the vision of that objective that gives incentive to the engineer to translate it into reality. The need for public works is evident to the engineer responsible for the maintenance of a service facility long before there is a public consciousness of this need. The public sees the completed structure and by their ready acceptance of its usefulness tacitly pay homage to engineering planning. Unfortunately, the public frequently forgets that the design must be based on a careful engineering analysis of factual data if the completed structure is to be the most effective and economical solution of a public need.

Tomorrow's Problems

As we study tomorrow's problems, we recall the unemployment emergency of a few years back—and the popular demand for the immediate starting of public construction work. We should not forget that this emergency need for employment found us unprepared for the effective utilization of the manpower then available—and how the public works official was expected to do the impossible—to provide worthwhile construction projects without the guidance of adequate planning.

Credit is due to those who faced that emergency and through whose efforts much was accomplished. That was an emergency period and our failure to be ready to undertake the responsibilities that come with it was understandable if not excusable. To have failed to learn by that experience is neither.

We are now engaged in a great war that is testing our capacity to produce, to arm, and to conquer. Because of the success of their planning, we may never know how much we owe to military staff groups who have through the years of peace prepared the blueprints of war. But when military objectives are won, plans will be needed to guide us on our return to a peace-time economy. We can lose the peace on the home front through a lack of preparedness.

Our battles are being won because military men with a vision stayed with their planning despite the popular belief that war would be no more. It was not easy for them to go counter to the wishful thinking of a nation that wanted peace—and it will not be easy now to gain popular support for the staff work that must be done in the preparation for peace. Unlike the plans for war, the plans for peace must be of, for, and by the people and acceptable to the majority. We are not regimented when we plan together for our mutual good.

Future Public Works Programs

We are prone to envision programs of post-war public works against the background of a program that was designed to meet an emergency situation. If our future public works programs are to be most effective in stabilizing a national reemployment situation, certain controls may be necessary to insure the scheduling of construction work at such levels of activity as may be necessary to avoid either a wasteful surplus or a shortage of the necessary supplies and labor. The post-war public works program will have failed in a proper objective if it functions only after an anticipated situation has been allowed to become an emergency.

We can face the complexity of these post-war problems and attempt to reach rational solutions—or we may become lost in the confusion of conflicting interests and forget that the freedom we enjoy can be had only through the acceptance by the majority of necessary rules of orderly procedure.

We may wait until dole-like contributions of governmental funds are necessary to stimulate a sick domestic economy—or we may in government, as in public health, recognize that prevention is better than a cure, and provide the funds necessary for advance planning.

A post-war public works program will be of value in the stabilization of employment to the extent that there is at all times an adequate reserve of planned projects ready for construction, and a public willingness to schedule their construction to meet this need.

Advance Planning Required

A reserve of planned public works projects will require more than the mere tabulation of recognized public needs. Advance planning will require the completion of detailed engineering studies and the preparation of engineering reports. It will require that there be an acceptance of the project by the sponsoring community and the completion of necessary legal and financial clearances for construction. The orderly development of a reserve of planned public works may well require that there be a coordination of governmental interest, local, State, and Federal, in the planning of projects for deferred construction. The maintenance of an adequate reserve of planned public works to attain a national objective of effective employment stabilization may require that there be an acceptance of some control of possible overexpansion of construction activity.

Through a properly integrated program of public works, this nation can achieve a standard of national well-being beyond our present expectations. There is little need to catalogue the improvements that can be made in the field of sanitation—they are known to most of us.

If we truly believe in a democracy and are willing to work at keeping its principles alive, we can have this material progress and at the same time save the spirit that has made this nation great. If in the planning for the future we neglect democratic procedures, our public works may well become but a monument to a decadent civilization.

CANADIAN SEWAGE INSTITUTE HELD ANNUAL MEET IN NIAGARA FALLS, ONT.

A Report
By GEORGE E. SYMONS
Assoc. Editor

TO anyone who has had the privilege of attending an annual meeting of the Canadian Institute of Sewage and Sanitation, it seems unnecessary to talk in terms of the Good Neighbor Policy. Except for some minor inconveniences of crossing the border, which, incidentally is the longest unfortified border in the world, there is little or no evidence that these are separate countries. Perhaps our Canadian friends treat us a little more cordial than we do them, but we think of them as one of us. Haven't we had our AWWA meetings in Toronto? Haven't we had Norman Howard as Pres. of AWWA? Isn't the Canadian Institute a member of FSWA? And didn't FSWA just elect Dr. Berry of Toronto, vice president? We have much in common with those folk and it is a pleasure to meet with them.

Presidents

Outgoing	Incoming
B. F. Lamson	*R. H. Parsons*
City Engr.	*City Engr.*
St. Catharines, Ont.	*Peterborough, Ont.*

Such was the case when we journeyed across the Rainbow Bridge to the Hotel General Brock for the Tenth Annual Convention of CISS on Oct. 28 and 29, last year. As an American from the States we were not alone. Far from it. Of the 202 persons registered over ten per cent were from the N. Y. State Sew. Wks. Assn., including the president of that organization, E. J. Smith. As a matter of fact two of the principal speakers were from NYSSWA, A. S. Bedell, of Albany, and W. L. Malcolm, of Cornell. (Prof. Malcolm being a Canadian is also a charter member of CISS.)

What happened at the meeting, the papers read, the entertainment provided, and the general camaderie added up to a far more lengthy report than the present shortage of paper will allow. Had there not been a paper shortage, this report would have appeared some time ago. As it is only the briefest resume of the high spots are possible.

Business Meeting

Vice Pres. R. H. Parsons, City Engr. of Peterborough, Ont. was elected as Pres. for next year. R. J. Demarais was elected Vice Pres. and R. W. Garrett, London, and H. S. Nicklin, Guelph, were elected trustees. Dr. Albert E. Berry was again reelected Secy.-Treas.

Financing Municipal Works

In the CISS meetings guided discussions are popular and this subject was one so treated, under the leadership of Mr. N. MacNicol, Forest Hill. Mr. MacNicol commented on immediate versus deferred financing, and mentioned the Canadian practice of issuing debentures, some of which may be issued by the Provincial Dept. of Health in the name of the city when sanitation improvements are ordered as a public health measure. Of interest was the comment on the new Canadian law to allow money to be set aside for post war building.

Fed. Sew. Wks. Ass'n

Vice-Pres.	Past Pres.
Dr. A. E. Berry	*A. S. Bedell*
Ont. Dept. Health	*N. Y. Dept. Health*
Toronto, Ont.	*Albany, N. Y.*
(CISS Secy.)	*(NYSSWA Secy.)*

Mr. David Jack of Kingston read a paper by Dr. C. A. Curtis, Prof. of Political Economy at Queens University, Kingston. Dr. Curtis' paper dealt with the topic of financing public works, and pointed out that trying to classify expenditures was a part of history. Public utilities do not usually cover their costs even for water supplies and far less often for sewerage facilities. The latter are usually paid out of levies and as such are based on the principle of ability to pay. Sewer rentals on the other hand are based on the principle of of benefit.

Sewer rentals are usually vague and seldom have the same basis in different cities. Dr. Curtis quoted Wm. Storrie to show that there are six methods of fixing sewer rentals in the U. S. These include (1) uniform charge, (2) number of sewer connections, (3) type of property, (4) number of plumbing fixtures, (5) water consumption, (6) metering sewage. Of the six the latter is probably the most exact but water consumption is easier of determination and sufficiently accurate to give a basis of service rendered.

Sewer rentals usually put the load on the tenant, relieve the tax load and broaden the tax base. Dr. Curtis recommends the collection of water and sewage rents together and the merging of water and sewerage service into one organization.

In the guided discussion these questions received comment: How does your municipality finance work in connection with (a) construction of, or additions to the sewerage system, (b) maintenance and operation of the system. Mr. W. H. Riehl of Stratford, Mr. Nicklin of Guelph, Mr. Wadell of Owen Sound and Mr. MacNicoll discussed these topics with respect to their own cities.

Programmers

Dr. C. R. Young	*Dr. W. L. Malcolm*
Dean Applied Science	*Dir. Civ. Engr. School*
Univ. of Toronto	*Cornell Univ.*

On the matter of advantages and disadvantages of the sewer rental

plan of taxation for financing construction and operation of sewerage systems, Mr. William Storrie reviewed briefly a paper he had presented in 1940 before the Canadian Sect. AWWA on that subject and pointed out that the new Canadian law follows the U. S. practice. There are now some 600 communities in 35

Programmers

N. Mac Nicol
City Engr.
Forest Hill, Ont.

R. F. Legget
Prof. Civ. Engr.
Univ. of Toronto

states with sewer rental plans in cities of less than 25,000 and six cities with populations over 100,000. Of these Buffalo is the largest and Mr. Storrie asked Dr. Symons, formerly of the Buffalo Sewer Authority to comment on Buffalo's experience.

One significant fact about Buffalo's experience according to Dr. Symons is that 55 per cent of the income is secured from sewer rentals based on water consumption while the other 45 per cent is a real estate tax. In this manner both the principle of payment for service rendered and ability to pay are served. Also, unimproved property which discharges storm water into the city sewers is thus paying for part of the operation for services rendered. Another significant fact was that collections had approximated 95 per cent of the assessments and charges for five years of operation.

Still another unique fact was the law which provides for the collection of special service charges where industrial waste loads are excessive. Dr. Symons described the formula he had developed for Buffalo whereby special service charges could be assessed against industries which discharged wastes having higher chlorine demand or higher suspended solids content than the average for the city. At the time several of the industries were paying the assessed charges and studies were being made at several other plants preparatory to the assessment of these special charges. (Ed. Note: An article on the subject of Special Industrial Charges at Buffalo has been prepared by Dr. Symons and will appear in an early issue of *Water Works and Sewerage*).

Conservation and Sanitation

Mr. R. F. Legget, Assoc. Prof. of Civ. Engr. at the University of Toronto spoke on the subject of conservation and what it means to sanitation. "Sanitation is conservation of human life and water, both of which are natural resources." Prof. Legget proceeded to unfold an excellent talk on the need for sanitation as a part of essential conservation and he gave many examples of how areas had banded together to conserve water resources by sewage treatment.

Mr. Legget suggested that we (1) realize that our natural resources are limited and must be conserved, (2) appreciate that all renewable resources are related, (3) know water is most important, (4) understand that water in any one valley is one area entity regardless of political boundaries, (5) relate special problems to the general picture, (6) give sanitation a priority in post war planning, not just to make jobs for soldiers but because sanitation is needed and (7) *stop talking glibly* about Canada's (or the U. S.) boundless resources.

(1) (2) (3) (4)

Among Those Present

(1) *Wm. Storrie*
Cons. Engr.
Toronto, Ont.

(2) *W. L. McFaul*
City Engr.
Hamilton, Ont.

(3) *W. H. Riehl*
City Engr.
Stratford, Ont.

(4) *Stanley Shupe*
City Engr.
Kitchener, Ont.

Sewage Treatment Practice

A. S. Bedell, Chief, Bureau of Sewage of the N. Y. State Dept. of Health spoke on "Standards for Municipal Sewage Treatment Plants" pointing out that the U. S. had no national standards, that many states had some standards, and that there was a tendency to classify receiving bodies of water and set up standards for streams.

In general, Mr. Bedell, said that the basic standards of the old Lawrence Expt. Sta. hold true, that departments of health strive to have treatment plants meet good sanitary engineering practice both as to design and operation. Among these good sanitary engineering practices Mr. Bedell mentioned, the use of the receiving body of water to carry its share of the load, provision of adequate plant site to accomodate expansion, provision of standby pump capacity, provision of grit chambers even on separate systems, proper design of Imhoff and primary tanks, provision of heat for separate sludge digestion, disinfection where necessary, bypasses around certain parts of the plant, measurement of flow, laboratory control and others.

Dr. A. E. Berry, Ontario Dept. of Health, read a short paper on "Sewage Treatment for Small Homes and Institutions." In Ontario, 60 per cent of the population has urban sewage disposal. There are still many private works which must meet the approval of the Dept. of Health. Dr. Berry spoke on the size of septic tanks for different population loads, dosing tanks, prevention of discharge of septic tanks to storm sewers, spacing of drain tile, benefits of grease traps, and the need for but general lack of attention to septic tanks.

Design of Storm Sewers

The topic of Storm Sewer Design was ably tackled by Prof. W. L. Malcolm, Director of the School of Civil Engineering at Cornell Univ., who spoke on "United States Practice" and by Mr. David Jack, City Engr. of Kingston, Ont. who spoke on "Canadian Practice." Prof. Malcolm had sent out 280 questionnaires and received over fifty per cent return in replies. From these replies Prof. Malcolm had developed a picture of storm sewer design in the United States with reference to such possible use of empirical rules for each locality, employment of the rational method of storm sewer design, development and use of rainfall curves, use of runoff factors.

Prof. Malcolm also asked four questions on sanitary sewer design: what velocity is considered as mini-

mum for self cleaning? what factor is used to obtain maximum "domestic sewer flow" from average water consumption per cap per day? are domestic sewers designed for maximum flow to fill half the pipe or the whole pipe?; are allowances made for infiltration in all cases or is the ground water table determined and allowance made only when above the sewer?

Inspection Trip
Luncheon, Entertainment, Banquet

Prof. Malcolm not only gave a summary of answers to these questions which showed a rather wide variation in factors used in design, but he also gave a thoroughgoing discussion of the rational method of design as against empirical methods.

On the matter of storm sewer design the answers by and large led to these conclusions: (1) If the average water consumption can be obtained, the domestic sewage flow may be calculated by using a factor between one and two, but considerable judgment is necessary. (2) There is a slight trend toward state requirements that sewers have certain minimum capacities varying from 400 gpcpd for laterals to 20 gal. per lin. foot of sewer per day. (3) Infiltration is provided for, if in the experience of the consultant it is deemed necessary. This appears to be a general practice although some municipalities require provision for infiltration in all cases. (4) Two feet per sec. seems to be the minimum velocity at which the majority of designers aim. (5) Present trend is to design for flow in full depth of pipe. (6) In storm sewer design, the rational method is used more and more. (7) It is not possible to tell from the answers how engineers arrive at rainfall curves. (8) Most engineers use frequency curves selecting a frequency of 5, 10, or 15 years as an overall curve throughout the entire area. (9) There is no unanimity of opinion or trend as to the factor to use for run-off in any type of area, rural, built-up, unpaved good-residential, crowded residential, or business-district.

Mr. Jack's paper on Canadian Practice was a fitting adjunct to the paper by Prof. Malcolm. Both had delved into the work of Kuichling, Ogden and others on this subject. Mr. Jack observed that the national method does not hold good in all conditions, and the greatest runoff is not when all areas are contributing.

Inspection Trip

By special arrangement it was possible for the group to cross the border to inspect the sewage treatment plant of the City of Niagara Falls, N. Y. Mr. Wesley Clark, City Engineer and Mr. E. J. Smith, Sup't. of the plant were hosts at the inspection. This particular plant has been the scene of many inspections, situated as it is on the side of the Niagara River Gorge, reached only by elevator and tunnel, and employing sand disc screens and chlorination as its treatment. One of the interesting features is to observe how the designer built the plant step wise to meet the problem of dissipating 114 feet of head through the plant.

Luncheons, Dinners, and Entertainment

Dinner on the first evening followed a social hour at which the manufacturers were hosts. In this system all manufacturers join together to entertain all those in attendance in one large social gathering before dinner. The meeting is stopped on time and the social hour likewise closes when dinner is ready to be served.

After dinner Mr. Arthur S. Bedell. past Pres. of the Federation of Sewage Works Assocs., told the group about the recent Federation Convention in Chicago, about the growth of the organization and about the election of Dr. Berry as Vice President.

Also after dinner, an interesting floor show was provided by the manufacturers, and motion pictures followed. After the evening's entertainment in the banquet hall, all present returned to the social room for a lively evening of songs, and good fellowship as the guests of the manufacturers.

Following the noon lunch on Friday, Dr. C. R. Young, Dean of the Faculty of Applied Science, University of Toronto, gave an address on "The Place of the Engineer in the Post War World." Dean Young's talks are noted for being interesting, entertaining and inspiring. This one was no exception, and brought forth clearly the adaptability of the engineer to conditions and the expectation that in the post war period the engineer will be a busy man helping to combat inflation by creating new consumer goods and improving old construction or making new. Dean Young emphasized the need for research in all fields including sewage treatment. Too many cities have had to forego further research in sanitation because of war depleted staffs. Too many cities have never been interested in research. They should be. Too many schools have likewise had to forego research. In the post war world research must again become a dominant factor in all engineering and especially in sanitation.

And Then, a Chemist Was Hired

In the biography of J. Willard Gibbs, the Yale Professor renowned for his contributions to science, Miss RuKeyser, the author, gives us the following "gem" as an illustration of the state of scientific knowledge in New Haven about 1900.

"There was typhoid fever in New Haven and the newspaper was attacking the water company bitterly. A man went into the office of the New Haven Water Company and the entire force crowded around him when he said that he could prove that they were not responsible. They offered him anything to prove that for them.

"'Why,' he said, 'that's easy. There's a waterfall right up near the source . . .'

"'That's right,' they said, 'What of it?'

"'Well,' he went on, 'it stands to reason: No microbe could get over those falls without breaking its goddamned neck'"

[To Charlie Hoover of Columbus, our thanks for bringing this *"Owed to a Waterfall"* to our attention.]

NEW P-141 SEWERAGE ORDER

Issued January 5th by Government Division, W.P.B.

THE following represents reproduction in full of the amended P-141 Preference Rating Order just issued by the Government Division of W.P.B.

Inasmuch as time does not permit the preparation of an analysis of this amended and improved order we are offering it just as it stands and we urge every reader interested in sewerage and sanitation to study this amended order and compare it with the original P-141 Order.

WAR PRODUCTION BOARD

PART 3287—GOVERNMENT SERVICES [1]

[Preference Rating Order P-141, as Amended Jan. 5, 1944]

PUBLIC SANITARY SEWERAGE FACILITIES—MAINTENANCE, REPAIR AND OPERATING SUPPLIES

§ 3287.26 [1] *Preference Rating Order P-141*—(a) *Definitions.* For the purpose of this order:

(1) "Operator" means any individual, partnership, association, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not, located in the United States, its territories, or possessions, engaged in or constructing facilities for the purpose of engaging in, the operation of a public sanitary sewerage system or a public sanitary sewerage system combined with a storm sewerage system, whether or not such operator has applied the preference ratings herein assigned.

(2) "Controlled material" means steel—both carbon (including wrought iron) and alloy—copper (including copper base alloys) and aluminum, in each case only in the forms and shapes indicated in Schedule I of CMP Regulation No. 1.

(3) "Material" means any commodity, equipment, accessory, part, assembly or product of any kind.

(4) "Maintenance" means the minimum upkeep necessary to continue an operator's property and equipment in sound working condition.

(5) "Repair" means the restoration of an operator's property and equipment to sound working condition after wear and tear, damage, destruction of parts or the like, have made such property or equipment unfit or unsafe for service.

(6) "Operating supplies" means:

(i) Material which is essential to the operation of the system specified in paragraph (a) (1) and which is generally charged to operating expense account.

(ii) Material for an addition to or an expansion of sewerage system or works, other than buildings, provided that such an addition or expansion shall not include any work order, job, or project, in which the cost of material shall exceed $1,500 in the case of underground sewer or pipeline addition or extension, and $500 in the case of any other addition or expansion and provided that no single construction project shall be subdivided into parts in order to come below these limits.

(7) Material for "maintenance", "repair" and "operating supplies" includes any material which is essential to minimum service standards, and does not include material for the improvement of an operator's property or equipment through the replacement of material which is still usable.

(8) "Supplier" means any person with whom a purchase order or contract has been placed for delivery of material to an operator, or to another supplier.

(9) "Calendar quarterly period" means the several three months of the year commencing January 1, April 1, July 1, and October 1, or the operator's customary accounting period closest to such period.

(10) "Inventory" means all new or salvaged material in the operator's possession, unless physically incorporated in plant, without regard to its accounting classification, excluding, however, material which is segregated for use in additions and expansions specifically authorized under paragraph (g) (2) of this order or by an operative preference rating order or certificate issued by the War Production Board.

(b) *Preference ratings.* A preference rating of AA-1 is hereby assigned to orders to be placed by an operator for material to be used for maintenance or repair, and for operating supplies.

NOTE: Paragraph (2) deleted Jan. 5, 1944.

(c) *Controlled materials* — (1) *Steel and copper.* Subject to the quantity restrictions contained in paragraph (f) of this order, any operator requiring delivery of any controlled material, except aluminum, for maintenance, repair or operating supplies, may obtain the same by placing on his delivery order the certification required in paragraph (e) (1) (i) hereof. An order bearing such certification shall constitute an authorized controlled material order.

(2) *Aluminum.* (i) Any operator requiring aluminum in any of the forms or shapes constituting a controlled material, for essential maintenance, repair or operating supplies, where the use of other materials for the purpose is impracticable, may obtain the same from a controlled materials producer or from a distributor specifically authorized by the War Production Board to engage in the business of receiving aluminum for sale or resale, in an amount not to exceed 100 pounds from all sources during any one calendar quarterly period by placing on his delivery order the certification required in paragraph (e) (1) (i) hereof. An order bearing such certification shall constitute an authorized controlled material order.

(ii) Any operator who requires aluminum in any of the forms or shapes constituting a controlled material, in amounts aggregating more than 100 pounds from all sources during any one calendar quarterly period for use as essential maintenance, repair or operating supplies where the use of other material for such purpose is not practicable, may apply for an allotment of the amount thereof in excess of 100 pounds during any one calendar quarterly period by letter addressed to the Aluminum and Magnesium Division, War Production Board, Washington, D. C., Ref: P-141. The letter should contain substantially the information called for by paragraphs (d) (1) to (6) of Supplementary Order M-1-i, as amended March 10, 1943. If the application is granted, the applicant will receive an allotment number or symbol and may place an authorized controlled material order by endorsing an order with such allotment number or symbol and the certification prescribed in paragraph (e) (1) (i) hereof.

(d) *Restrictions on use of symbol and ratings.* (1) The allotment symbol and preference ratings hereby assigned shall not be used by an operator or supplier to obtain deliveries of scarce material, the use of which could be eliminated without serious loss of efficiency by substitution of less scarce material or by change of design.

(2) The preference ratings assigned by paragraph (b) (1) hereof for maintenance, repair and operating supplies shall not be used to obtain any item included in Lists A or B of Priorities Regulation No. 3.

(e) *Application and extension of ratings; application of CMP allotment symbol*—(1) *Certification.* The AA-1 rating assigned by paragraph (b) of this order and the CMP allotment symbol MRO-P-141 may be applied by an operator to deliveries of material for use in maintenance, or repair, or as operating supplies only by use of a certification in substantially the following form:

Preference Rating AA-1, CMP Allotment Symbol MRO-P-141. The undersigned pur-

[1] Formerly Part 3209, § 3209.1.

chaser certifies, subject to the penalties of Section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that to the best of his knowledge and belief the undersigned is authorized under applicable War Production Board regulations or orders to place this delivery order, to receive the item(s) ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order.

Name of operator

Signature of designated official

Such certification shall be signed manually or as provided in Priorities Regulation No. 7.

NOTE: Paragraph (2), formerly (3), redesignated Jan. 5, 1944.

(2) The ratings assigned by this order may be extended by a supplier in the manner provided in Priorities Regulation No. 3, and CMP Regulation No. 3.

(f) *Restrictions on deliveries, inventory and withdrawals*—(1) *Deliveries and withdrawals.* No operator shall, during any calendar quarterly period, accept delivery of any material or withdraw from inventory any material, to be used for maintenance or repair or as operating supplies or for any other purpose (except material to be segregated for use in extensions specifically authorized under paragraph (g) (2) of this order or by an operative preference rating order or certificate issued by the War Production Board), the aggregate dollar value of which shall exceed the aggregate dollar value of materials used for maintenance or repair or as operating supplies, during the corresponding calendar quarterly period of the year 1942, or at the operator's option, twenty-five per cent of the aggregate dollar value of materials used for said purpose during the operator's fiscal year ending closest to December 31, 1942.

(2) *Inventory.* No operator shall at any time, accept delivery of any material if the operator's inventory will, by virtue of such acceptance, be in excess of a practical working minimum.

(3) *Exceptions.* The provisions of paragraph (f) (1) of this order are subject to the following exceptions.

(i) An operator who, during the calendar year 1942 (or fiscal year ending closest to December 31, 1942), used for maintenance, repair, and as operating supplies, materials of the aggregate value of not exceeding $1,000 and whose estimated requirements for materials to be used for maintenance, repair and as operating supplies during any calendar year (or corresponding fiscal year) do not exceed $1,000 may, during such year, exceed the quantity restrictions prescribed by paragraph (f) (1) of this order. If the actual requirements of material for maintenance, repair and operating supplies for such year should prove to be in excess of $1,000, such operator shall not accept any deliveries of material or withdraw from inventory any material to be used for maintenance, repair or as operating supplies if such deliveries or withdrawals, when taken together with other deliveries or withdrawals within such year, would, in the aggregate, exceed $1,000. In such case the operator may apply for specific authorization to exceed such quantity restrictions pursuant to the provisions of paragraph (f) (4) hereof.

(ii) An operator may, in any calendar quarterly period, increase scheduled deliveries, and withdrawals of material required for maintenance or repair or as operating supplies over the limits prescribed in paragraph (f) (1) of this order, in proportion to the increase in the load on the system during the preceding calendar quarterly period of the year 1942 corresponding to the calendar quarterly period in question, determined by a measurement of the average daily flow for the two comparative periods: *Provided*, That in determining the average daily flow of sewage, any flow of surface storm water which enters the system shall not be taken into account.

(iii) An operator may, in any calendar quarterly period, accept deliveries of material or make withdrawals from inventory of material, necessary for the maintenance or repair of the operator's property or equipment which is damaged by acts of the public enemy, sabotage, explosion, or fire or by flood, storm or other similar climatic conditions: *Provided*, That if the restrictions of paragraph (f) (1) are exceeded because of such deliveries or use, a full report thereof shall be made within thirty days after such delivery or withdrawal, to the War Production Board.

(iv) An operator may, in any calendar quarterly period, accept delivery of material, having in the aggregate, a dollar value of not more than the dollar value of material of the same class taken from the operator's inventory for delivery to other persons authorized to accept delivery under applicable regulations of the War Production Board but only if, and to the extent that such taking has reduced the operator's inventory of material below a practical working minimum.

(v) An operator may, during any calendar year (or his fiscal year), withdraw from inventory, material, having in the aggregate, a dollar value of not more than the dollar value of usable material of the same class salvaged from plant during such year.

(vi) The provisions of paragraph (f) (1) and (f) (2) shall not apply to fuel or to chemicals for sewage treatment.

(4) The War Production Board, on its own initiative, or on application of any operator by letter, in triplicate, addressed to the Government Division, War Production Board, Washington, D. C., Ref: P-141, may modify the limitations on practical working minimum inventory, and on scheduling or accepting deliveries, or on use or withdrawals, set forth in this paragraph (f).

(g) *Restrictions on construction of sewerage facilities.* No operator shall construct any sewerage facilities, including but not limited to sewer pipelines, manhole structures, pumping stations, sewage disposal or treatment plants and connections, and no operator shall, in case of contract construction, accept deliveries of material for such purposes except as follows:

(1) An operator may construct an addition to or an expansion of, sewerage system or works, other than buildings: *Provided*, That such addition or expansion shall not include any work order, job or project in which the cost of material shall exceed $1,500 in the case of underground sewer pipeline addition or extension, and $500 in the case of any other addition or expansion: *And provided*, That no single construction project shall be subdivided into parts in order to come below these limits: *And further provided*, That in making house connections or extension of line to serve premises, no iron or steel pipe shall be used except the minimum quantities required in making necessary connections.

(2) An operator may construct an extension of sewerage facilities, other than buildings, to serve premises which are being built or remodeled under authority of any Preference Rating order of the P–55 series, a specific authorization issued pursuant to Conservation Order L–41 or pursuant to any Petroleum Administrative Order issued by the Petroleum Administrator for War if all of the following conditions are satisfied:

(i) The cost of material for such extension does not exceed $5,000 (but exceeds $1,500 in the case of underground sewer pipeline extension or $500 in the case of any other extension).

(ii) The extension does not duplicate an adequate service already installed.

(iii) No other operator can render the same service with lesser amounts of critical material.

(iv) The extension will not cause an overload on system including sewage disposal plants.

(v) The operator has completed Form WPB–3445 and delivered it to the builder of the premises to be served for attachment to the builder's application for L–41 approval. Preference ratings and allotment number to acquire material required for such extensions are assigned by paragraph (h) of this order.

(3) In addition to the authorization contained in paragraphs (g) (1) and (g) (2) an operator may construct sewage facilities of any kind if such construction is specifically authorized by the War Production Board. Application should be made on Form WPB–617 (formerly PD–200) or on such other form as may be prescribed. The following preference rating orders or certificates include permission for construction under this order although they do not say so: PD–19–h, CMPL–127, CMPL–224. In all other cases a preference rating is not enough.

unless the instrument which assigns the rating also states that construction is permitted. However, any operator who prior to January 15, 1944, has been specifically authorized in writing by the War Production Board to use the lowest rating assigned to a rated project to obtain material to construct sewerage facilities to serve such project may use such rating to obtain material required for that purpose within the limits of said authorization.

(h) *Assignment of preference rating and CMP allotment symbol for extensions authorized under paragraph (g) (2).* (1) The preference rating AA-3 is hereby assigned to orders for material other than controlled material, and the abbreviated allotment number P-141-S2 is hereby assigned to orders for controlled material to be placed by an operator for use in the construction of extensions of facilities authorized by paragraph (g) (2) of this order or to replace in inventory material so used.

(2) The preference ratings and allotment number assigned by paragraph (h) (1) may be applied by an operator by using the certification provided in CMP Regulation No. 7. An order for controlled material bearing such certification and allotment number shall constitute a controlled material order.

NOTE: Paragraphs (i), (j), (k), (l), (m) and (n), formerly (h), (i), (j), (k), (l), and (m), redesignated Jan. 5, 1944.

(i) *Sales of material from inventory.* Any operator may sell to another operator, material from seller's inventory in excess of a practical minimum working inventory: *Provided*, That (1) a preference rating of AA-5 or higher assigned by this order or by any preference rating certificate, or (2) a specific direction issued by the War Production Board, is applied or extended to the operator selling such material.

(j) *Audits and reports.* (1) Each operator and each supplier who applies the preference ratings or allotment symbol hereby assigned, and each person who accepts a purchase order or contract for material to which a preference rating or symbol is applied, shall submit from time to time to an audit and inspection by duly authorized representatives of the War Production Board.

(2) Each operator and each such supplier shall execute and file with the War Production Board, such reports and questionnaires as said Board shall from time to time request, subject to approval by the Bureau of the Budget as required under the Federal Reports Act.

(3) Each operator shall maintain a continuing record of inventory and of segregated material in his possession and all material used by him for maintenance, repair or as operating supplies.

(k) *Communications to the War Production Board.* All reports required to be filed hereunder and all communications concerning this order shall, unless otherwise directed by the War Production Board be addressed to the War Production Board, Government Division, Washington, D. C., Ref: P-141.

(l) *Violations.* Any person who wilfully violates any provisions of this order or who, in connection with this order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States, is guilty of a crime and, upon conviction, may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using material under priority control, and may be deprived of priorities assistance.

(m) *Revocation or amendment.* This order may be revoked or amended at any time as to any operator or any supplier. In the event or revocation, deliveries already rated pursuant to this order shall be completed in accordance with said rating, unless the rating has been specifically revoked with respect thereto. No additional applications of the ratings to any other deliveries shall thereafter be made by the operator or supplier affected by such revocation.

(n) *Applicability of regulations.* (1) Preference Rating Order P-141 is issued in lieu of Preference Rating Order P-46 in so far as it affects public sanitary sewerage systems as defined in paragraph (a) (1) hereof and any reference in any order or regulation of the War Production Board to said Preference Rating Order P-46 shall constitute a reference to orders in the P-141 series.

(2) This order and all transactions affected hereby, except as herein otherwise provided, are subject to all applicable regulations of the War Production Board as amended from time to time, *Provided*, That none of the provisions of CMP Regulations No. 5 or No. 5A shall apply to operators as defined in paragraph (a) (1) hereof, and no such operator shall obtain any material under the provisions of either of said regulations.

Issued this 5th day of January 1944.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

Handbook of Applied Hydraulics

(A Review)

Edited by Calvin Victor Davis, Project Engineer, Fontana Dam, N. C., Tennessee Valley Authority, this "Handbook of Applied Hydraulics" is a general reference manual covering all phases of modern hydraulic engineering. Written by eighteen specialists, contributing their experience and knowledge, the book deals mainly with practical aspects of the field and provides detailed data on hydrology, water supply, sewerage, water power, hydraulic structures, and related subjects.

Of special interest to sanitary engineers are sections 15, 16, and 17 on the hydraulics of water supply and treatment, written by Prof. Thomas R. Camp of Massachusetts Institute of Technology, and sections 18 and 19 on sewerage and sewage treatment, co-authored by Samuel A. Greeley, Consulting Engineer of Chicago, and Prof. William E. Stanley of Cornell University. Also of interest is section 2 on hydrology and the hydrolic cycle by Clarence S. Jarvin, of the Soil Conservation Service, Washington, D. C. Other sections deal with dams of various types, gates, spillways, outlet works, canals, hydroelectric plants, hydraulic machinery, irrigation, drainage, and hydraulic models.

In the section titled "Water Supplies" Prof. Camp delves into water consumption, uses and demands, and follows with classification of water supply sources, yields, surfaces water supplies, selection and preparation of reservoir sites, water-shed control, hydraulics of wells, their construction and required sanitary precautions.

"Distribution Systems," says Prof. Camp, "include pipes, valves, hydrants, and appurtenances used for distributing water; the elevated tanks and reservoirs used for fire protection, consumer pipes and services."

About "Water Treatment," Prof. Camp writes in some detail on the quality of water, type and capacity of plant, sedimentation, coagulation, filtration, softening, corrosive water treatment, disinfection, and tastes and odors. Pictures and diagrams are used to illustrate the various subjects under discussion.

Messrs. Greeley and Stanley have brought their wide experience to bear on the subjects of "Sewerage" with a lucid presentation of material on quantities and variations in the flow of sewage, quantity of storm water, hydraulics of sewers, capacity design, relation of structural design to hydraulics, special structures and pumping stations. All parts of this section are liberally illustrated with diagrams, tables and charts. In the section on "Sewage Treatment," these authors cover the sewage disposal problem, quality and characteristics of sewage, treatment processes and equipment, typical arrangements of treatment plant elements, hydraulic losses in general, hydraulic computations for the major elements of a sewage plant, and total head required for typical hydraulic profiles.

The book contains 1100 pages, 645 illustrations, many tables, sells for $7.50, and is published by McGraw-Hill Co., 330 W. 42nd St., New York City.

—George E. Symons.

THE DETERMINATION OF SETTLEABLE SEWAGE SOLIDS BY WEIGHT

A Proposed Procedure

By A. J. FISCHER
Development Engineer
THE DORR CO., NEW YORK CITY
and
GEORGE E. SYMONS*
Associate Editor
"WATER WORKS & SEWERAGE"
NEW YORK CITY

DIFFICULTIES in the determination of suspended solids by the Gooch crucible method and possible sources of sampling errors in the method have been noted before [1, 2, 3] and a method has been proposed for the determination of settling solids by weight [2, 3, 4]. However, there appear to be several disadvantages with this method and it has not found favor in sewage laboratories. Consequently, there still is a need for a satisfactory method of determining settleable solids, particularly as they apply in flocculation studies and in the evaluation of settling tank operation.

A technique suggested by Fisher and Hillman[5] involved the use of a 10-in. by 6-in. flocculator jar filled with sewage to a depth of about 4½ inches. Approximately 250 ml. of supernatant liquor were siphoned off at a depth of 1 inch after a period of one hour of quiescent settling. Suspended solids were determined on this sample by the Gooch crucible method.

The fact that the samples were taken 1 inch below the surface (chiefly to avoid disturbance of settled solids) does not pre-suppose that the dispersion density of the solids remaining in the liquid is constant from top to bottom. The effect of taking off the sample at this point is merely to reduce the overflow rate used. For example, the 1 inch depth sample gives a 1 inch per hour overflow rate (15 gal. per sq. ft. per 24 hrs.). If the sample were taken off at a 2 inch depth, the overflow rate would be double and one would expect more solids in suspension at this point.

A similar method was used by the Bird Island Laboratory of the Buffalo Sewer Authority from 1938 to 1941. The technique consisted of adding 1100 ml. of sewage to a one liter graduated cylinder. After quiescent settling for a period of one hour, 800 ml. of the supernatant liquor were siphoned off in such a manner that the top layer of 100 ml. and bottom layer of 200 ml. were not disturbed. Suspended solids were determined on an aliquot portion of this withdrawn supernatant liquor by the Gooch Crucible method.

Other variations in technique are used or have been suggested elsewhere, but there are objections to all of these methods.

1. Obviously, the determination is of non-settleable solids and to obtain settleable solids requires the determination of suspended solids and the calculation of settleable solids by difference between suspended solids and non-settleable solids.
2. In a tall cylindrical graduate there is a certain amount of flocculation or precipitation of solid particles on the glass surface.
3. Flocculator jars size requires a larger volume of sample than is usually available in a composite sample of the average treatment plant.
4. Determinations depending on the Gooch test for suspended solids are open to the sampling errors involved in the Gooch test.

In an effort to minimize some of the disadvantages, and to arrive at a technique which, though admittedly partly empirical, offers practical possibilities, the authors agreed in 1941 upon the following procedure used since in Buffalo. The technique, by its very nature, defines settleable solids as that matter which will not stay in suspension during the settling period.

Procedure

(1) Determine the suspended solids in a sample of the sewage under investigation.

(2) Pour a well mixed sewage sample into a glass vessel not less than 3½ in. in diameter, using a quantity of sample not less than 1 liter but preferably sufficient to insure a depth of 8 in. (The use of greater glass vessel diameters and larger volumes of sample, if available, may be desired to eliminate the possibility of disturbance of settled solids during the withdrawal of the portion for determination of non-settling solids. This difficulty may be almost entirely obviated through the use of a U-tube attachment on the intake end of the pipette or siphon used for the removal.)

(3) Allow to stand quiescent for one hour. Use of the theoretical detention period of the plant settling units is permissible if desired.

(4) Without disturbing the settled material or that which may be floating, remove 250 ml. of the sample from the center of the container at a point half way between the surface of the settled solids and the liquid surface.

(5) Determine the suspended solids in p.p.m. in all or in an aliquot portion of this supernatant liquor in accordance with standard procedures. The result is, of course, p.p.m. non-settling solids.

(6) Subtract this value from the total suspended solids in p.p.m. to obtain p.p.m. by weight of settleable solids.

It is believed that the results from this method more nearly represent the actual amount of suspended matter which is settleable under quiescent conditions, and that with this technique results obtained on the ratio of plant to laboratory removals will be more consistent as a measure of clarification efficiency.

*Formerly Chief Chemist, Buffalo (N. Y.) Sewer Authority.

(1) H. H. Wagenhals, E. J. Theriault and H. B. Hommon, "Sewage Treatment in the United States," U.S.P.H.S. Bull. No. 132, 1925.
(2) A. M. Buswell, A. L. Elder, C. V. Erickson and G. E. Symons, "New Method for Determination of Settling Solids," Part V, Illinois State Water Survey Bull. No. 29, 1930.
(3) Symposium: Standard Methods for the Examination of Sewage and Sewage Sludge: Comments by A. M. Buswell and G. E. Symons, "A New Method for the Determination of Settling Solids," Sewage Works Journal 2, 378-384 (1930).
(4) Standard Methods for the Examination of Water and Sewage, 8th Ed. P. 254.
(5) A. J. Fischer and A. Hillman, "Improved Classification by Prefloculation Without Chemicals," Sewage Works Journal 12, 280-302 (1940).

The Editor's Comments

The Challenge of That Blank Sheet of Paper

A WRITER friend of mine once remarked that a blank sheet of paper stuck in a typewriter roll was a definite challenge to produce something; an article, an editorial, a report, a story. All begin with an idea and a blank sheet of paper. So too, begins every creation of importance, a painting, a book, a piece of music, a bridge, a dam, a water works, or a sewerage system.

A blank sheet of paper on the drawing board is the challenge to the sanitary engineer of today to design those many structures and improvements in existing plants that should be built in the years that follow this war. That blank sheet of paper on the draftsman's table is also a challenge to the thinking citizen and the thinking municipal administrators to develop plans for financing those public works that are a definite need.

On a blank sheet of paper should begin the editorials of the local newspapers all over the country calling attention of the populace to the needs of many improvements in water and sewerage systems, or to the needs of a sewage treatment plant where none exists, or to the need of cooperation with industry to eliminate waste or provide adequate waste treatment to reduce stream pollution.

On blank sheets of paper in countless villages, towns, cities, counties, and states should begin the reports which envision the need for these public works, and which proposes methods for the fulfilling of these needs, with sound financing and businesslike administration, free of boon-doggling and waste; sound financing looking not to Washington for support of these public works programs.

And on a blank sheet of paper should begin the drawings from which constructions of these sanitary works can be made. Not next year, next month, next week, tomorrow—but today that blank sheet of paper should be tacked to the drawing table. It is today that the outlines of those designs should begin to take shape. And one must not forget that the drawings when completed are not to be filed and forgotten. They are to be Blueprinted Now, in order to have the whole set of working prints ready for construction when the war is over. Blueprint Now, too, that necessary plan for financing which should be developed on another blank sheet of paper.

Many sound ideas are lost for want of the driving force to get them down on paper. Most any one can talk about post-war planning and what should be done; but, all of this must be cataloged merely as wishful thinking until we accept the challenge of the blank sheet of paper. (G.E.S.)

Essential Objectives in Planning Post-War Betterments

Past experience has revealed the value of sound public works contruction programs as a means of providing employment locally, and important additional employment in manufacturing plants throughout the country, when needed employment becomes a nation wide problem. It is logical, therefore, that the plans of municipal authorities for the near future, when temporary (we hope) lack of work is anticipated, should be so developed as to put this method of creating employment into use on immediate notice.

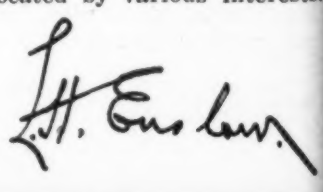
In such planning there are several essential objectives to be considered in advocating and developing programs of public-works construction as a measure of securing local improvements of permanent value in return for the investment in a made work program. These important objectives could hardly be more effectively presented and discussed than they have been by Earnest Boyce in his paper, "Objectives in the Programming of Post-War Sanitation Works," which we are privileged to reproduce elsewhere in this issue. It is a short and meaty paper and it is hoped that every reader of WATER WORKS AND SEWERAGE will read it, not once, but twice.

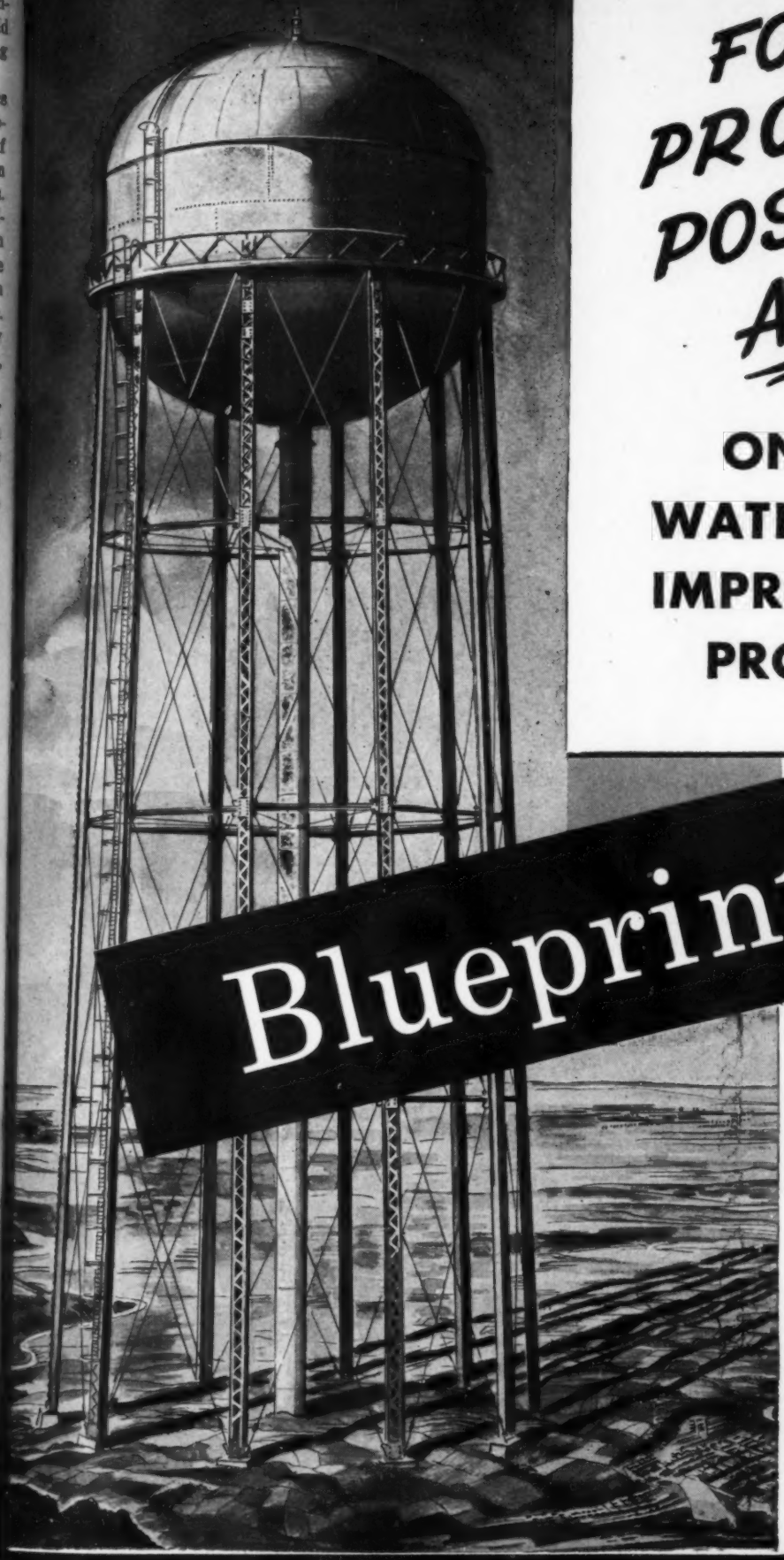
We can not help but quote from the Boyce paper some of its highlights, in hopes that the repetition on this page may further emphasize what we believe of primary importance in planning post-war sanitation works. He drives home with the statement that "the programming of post-war sanitation works will have missed an essential objective if there is a failure in the planning stage to develop a local interest in, and civic responsibility for, the proposed improvements." Further—"Any progress that is made without full recognition of the essential need for an informed and responsible electorate will be based on the shifting sands of political expediency, without adding to the stability of a free government of the people."

Recalling experiences in the public-works construction program in the late economic depression, for which there had been no advance planning or programming, we can look back with some wonderment at what came out of the program if one could disregard the high costs of not being prepared, the fumbling, the delay and the expense incident to not having plans for construction and financing ready.

As to the method of financing post-war public works, Commander Boyce strikes a vibrant chord when he reminds us all that once again "We may wait until dole-like contributions of government funds are necessary to stimulate a sick domestic economy—or, we may in government, as in public health, recognize that prevention is better than a cure, and provide the funds needed for advance planning."

After reading Commander Boyce's comments on the value of doing an effective educational job to secure the confidence and backing of the local electorate it was particularly impressive to learn just recently how successful has been Miami's educational program thruogh the local newspapers, which advocated several possible post-war public works projects in a series of articles. The end result was revealed in the newspaper poll conducted by the City Planning Board to determine the public's preferential rating of post-war projects. Highest on the list of projects desired by the citizens were sewer extensions and effective sewage treatment. And also high in the poll came water-works improvements, which Miami apparently does not feel the need for so pronouncedly as it does adequate sewage disposal —in itself strong evidence of the value of advance educational appeal to the electorate which must vote the funds for their choice amongst the post-war projects which are being advocated by various interests.





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MEETINGS SCHEDULED:

Jan. 19-21 — NEW YORK, N. Y. (Eng. Societies Bldg.).
American Society of Civil Engineers. (Annual Meeting.) Exec.-Sec'y, Geo. T. Seabury, Eng. Soc. Bldg., 29 West 39th St., New York, N. Y.
(Sanitary Engineering Div. Sessions, Thursday, Jan. 20th.)

Jan. 21—NEW YORK, N. Y. (Hotel to be selected).
New York State Sewage Works Ass'n. Sec'y, A. S. Bedell, State Dept. of Health, Albany, N. Y.
(Joint Annual Dinner of N.Y.S.S. W.A., and the Sanitary Eng. Div. of A.S.C.E., Friday, Jan. 21st.)

Jan. 20—BOSTON, MASS. (Hotel Statler).
New England Water Works Ass'n. Sec'y, Frank J. Gifford, 613 Statler Bldg., Boston, Mass. (Future meetings Feb. 17-Mar. 16.)

Jan. 31-Feb. 2 — COLLEGE STATION, TEXAS. (Texas A. & M. College).
Texas Water Works & Sewage Short School. Sec'y, V. M. Ehlers, State Health Dept., Austin, Texas.

Feb. 8-9—PORTLAND, ME. (Lafayette Hotel).
Maine Water Utilities Association. (Meeting evening of 8th and all day 9th.) Sec'y, Earle Tarr, Winthrop, Me.

Mar. 13-17—ST. PAUL, MINN. (Lowry Hotel).
Minnesota Section A.W.W.A. Sec'y, R. M. Finch, Wallace & Tiernan Co., 416 Flour Exchange, Minneapolis, Minn.

Mar. 23-24 — TRENTON, N. J. (Stacy-Trent Hotel).
New Jersey Sewage Works Association. Treasurer & Acting Sec'y, Edward P. Molitor, Chatham, N. J.

Apr. 11-13 — PEORIA, ILL. (Hotel not selected).
Illinois Section A.W.W.A. Sec'y, H. E. Hudson, Jr., 912 W. Charles St., Champaign, Ill.

Apr. 19-21 — NIAGARA FALLS, ONT. (General Brock Hotel).
Canadian Section A.W.W.A. Sec'y, A. E. Berry, Ontario Department of Health, Parliament Bldgs., Toronto, Ont., Can.

Apr. 26-28—JACKSON, MICH. (Otsego Hotel).
Michigan Section A.W.W.A. Sec'y, M. N. Gerardy, Detroit Dept. of Water, Detroit, Mich.

Apr. 27-28 — UTICA, N. Y. (Hotel Utica).
New York Section A.W.W.A. (Spring Meeting.) Sec'y, R. K. Blanchard, Neptune Meter Co., 50 West 50th St., New York, N. Y.

June 13-16—MILWAUKEE, WIS. (Hotel Schroeder.)
American Water Works Association (1944 Wartime Conference and Annual Meeting.) Executive Secretary, Harry E. Jordan, 500 Fifth Avenue, New York, N. Y.

Here and There with Doc Symons

IT'S NEWS, if you haven't heard it:—Indiana has a new Stream Pollution Control Board in accordance with a 1943 law. Cecil K. Calvert, Supt. of Water Purification at Indianapolis is a member of the board as is Joseph Quinn, Acting Chief Engr. of the Indiana Dept. of Health. Joe is technical secretary of the new board.—George J. Schroepfer, immediate past Pres. of FSWA and Supt. of the Minneapolis-St. Paul San. Dist., is to receive the Rudolph Hering Medal of the ASCE for his paper on "Experiences in Operating a Chemical-Mechanical Sewage Treatment Plant"—J. J. Woltman, Cons. Engr. of Bloomington, Ill., is acting Chief of the Illinois State Water Survey while Dr. Buswell is in the Army teaching at Edgewood Arsenal.—C. A. Niles, until lately associated with the Western New York Water Co. in Buffalo is now San. Engr. for Suffolk County, N. Y.—Bill Hurlbut of Los Angeles has been promoted to Chief Engr. of Water Works and Deputy Gen. Mgr. of the Los Angeles Water and Power Bureau as H. A. Norman moves up to Gen. Mgr. of the combined services.—Joe Gilbert has been promoted to Lt. Col. in the San. Corps which now has the status of a Division in the Surgeon General's Office, with Col. Hardenburgh as Director. Joe became Asst. Dir. with his new commission.

* * *

In a recent issue of the Jour. of the Am. Pub. Health Assoc. appeared a review of the Book "The Examination of Waters and Water Supplies" by Suckling. This comment was included: "Methods for chemical analysis correspond closely to those used in this country. As described they can be used only by a trained chemist. This is to the credit of the author. Too many American laboratory manuals are written with the hope that the office

This Sewage Plant Is Doing Its Part—
What Are You Doing with Your Sludge?

1944 brings a sharp increase in the millions of people who look to the United States for a large part of their food. Despite shortage of manpower and machinery, American food production must be increased, as a vital part of the war effort.

More fertilizer is needed than ever before. With normal supplies of fertilizing materials curtailed, every available source must be utilized—including sewage sludge. Today, the practice of burying or incinerating sludge represents a negligent waste of food—to say nothing of the profits which are yours from the sale of properly prepared and marketable sludge fertilizer.

In the photograph reproduced above, the sludge cake on the ground is hardly in condition for use as a fertilizer, although the fertilizing values are present. With its Royer Sludge Disintegrator, this New England sewage disposal plant has turned out many tons of excellent fertilizer, which is in demand among Victory gardeners and commercial growers, and the expense of sludge disposal has been eliminated. Hundreds of sewage plants are obtaining worthwhile profits by converting their sludge into fertilizer with a Royer.

This inexpensive and easily operated machine shreds, mixes, aerates and further dries the sludge; discharging an effective and ready-to-use fertilizer onto pile or truck. Sticks, stones and trash are automatically removed.

Royers are made in twelve stationary and portable models; and in sizes for every plant; electric motor, gasoline engine and belt-to-tractor driven; capacities up to 12 cubic yards per hour.

Take the first step toward doing your part in increasing America's food production by writing for the "Sewage Sludge Utilization Datalog".

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boy can replace the graduate chemist." We know a lot of fellows who are afraid that Standard Methods will degenerate into a "cook book" manual, and rather look down their noses at manuals with simple presentation. We also know some chemists (with sheepskins) who wish Standard Methods was written so they could understand it.—Not that we favor making janitors into chemists. Far from it. We too deplore that tendency in many places, but we have found some laboratory manuals quite usable, even though simplified.

* * *

Hats Off Dept. Lloyd Nelson has returned to his job of Eastern Mgr. of the U. S. Pipe and Foundry Co. in Phila. after serving as Prin. Engr. of the Water Division of OWU for a good many months. Full time from Nov. '41 to Feb. '42 and half time until Dec. 2, 1943. Lloyd's last job for OWU was to travel the country bringing the "Stop Waste and Conserve Fuel Program" to Water and Sewage Men everywhere. We heard Lloyd talk several times on this topic and never once did his enthusiasm or sincerity wane. It was a topic worthy of belief in and he believed in it. OWU and the Water and Sewage fraternity owe Lloyd a vote of thanks.

* * *

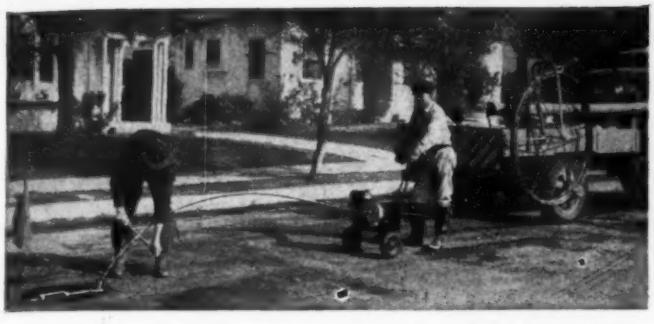
We journeyed to the L. I. Sect. NYSSWA meeting in Freeport, L. I., last month, where we learned that Francis Burr of Monsanto Chemical Co. is a raconteur (skilled story teller to you Mr. Ed.) of no small accomplishment. It was Paul Hiller of Innis-Spieden who introduced Fran in that role—And, Dutch Holland of Freeport (host no less) taught us all a new way to get stuck for the check, too.

* * *

Do you wonder with us why the suspended solids content of sewage from camps housing colored troops is 0.27 lb. per cap. per day while that from white troops averages but 0.18 lb./cap/day.

* * *

At the NESWA Sept. meeting in Boston, listeners had a liberal education on the matter of small sewage disposal plants, otherwise known as septic tanks. Ed. Wright of the Mass. Dept. of Health says some call them "Skeptic" tanks. Another chap said a "tried and true" formula in his neighborhood was one bushel of blue vitriol in the fall of each year. We countered with the formula we learned in Western N. Y. State—one or two cakes of compressed yeast



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1—Mount a FLEXIBLE "EZY" Rod Reel on your service truck. Back the truck into position. Enter the tools into the line with the aid of the Rod Guide.
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3—Disconnect the Rods remaining on the Reel. Turn into the obstruction, either by hand with Ratchet Turning Handles or by using the FLEXIBLE Power Drive, as shown.
4—All equipment is close to the manhole, permitting traffic to proceed without interruption. When the obstruction is removed, rewind the Rods on the Reel, load tools on the truck and you are ready for the next job.

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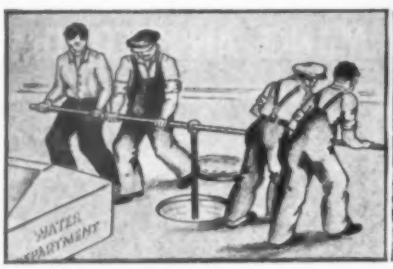

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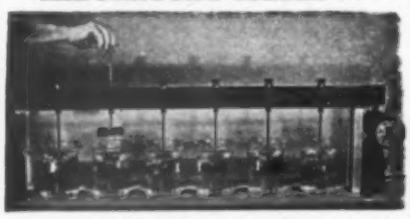

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- No jute used—gasket centers spigot.
- Definite space in each joint for cement.
- Form confines cement-grout to lower portion of joint.
- Particularly advantageous in water-bearing trenches.
- Infiltration minimized.

L. A. WESTON Adams, Mass.

each spring. Guaranteed to make the residue disappear, so we were told.

* * *

Something besides the Dodger "Bums" comes out of Brooklyn. Here is an idea of Martin Burger who writes in the "Analyst," "In laboratories requiring the sterilization of many pipettes, it is customary to place washed pipettes in metal containers for sterilizing. Without a soft mat in the bottom of the can, the tips of the pipettes often become marred or broken. Cotton disintegrates after a few heatings and sticks to the tips. To eliminate the annoyance, a mat of light copper turnings, such as are used by housewives for scouring pans, is a very good substitute for cotton. These copper turnings are soft enough to prevent marring of the tips, and they do not deteriorate when subjected to continuous use."—*And,* Mr. Burger forgot to add, they are also practically unobtainable.

* * *

The Lexicographer's Easy Chair. Antiseptic: *a. Bacteriol.* Of or pertaining to the condition in which a substance or animal is kept sterile against the growth of pathogenic or putrefactive bacteria. *n.* Any substance having antiseptic qualities as carbolic acid, bi-chloride of mercury, sulfa drugs.

Disinfection: *n.* The act of disinfecting or destroying the germs of infectious or contagious diseases. Distinguish from antiseptic in that it is not intended to be used in actual contact with the living person. Distinguish also from sterilization.

Lexicographer: *n.* One who compiles dictionaries.

Pathogenic: *a.* Of or pertaining to bacteria or microorganisms or viruses which produce or cause disease.

Sterilization: *n.* Act or condition of eliminating or completely destroying all living micro-organisms, vegetative spores, and viruses whether disease producing or not.

Sesquipedalian: *a.* Measuring a foot and a half; long and ponderous, as words.

* * *

Can you imagine this! ! W. H. (for Homer) Wisely, recently appointed full time secretary and Editor of the Fed. of Sew. Wks. Assns. was born in Coulterville, Ill. Harry Jordan, Secy. and Editor of the Am. Water Wks. Assn. was born in that same Coulterville. If you want to start raising National Secretaries maybe some good-old Coulterville dirt is what's needed.

We noted in the December issue of Civil Engineering, that the Engineering Economics Division of ASCE is to study and report on the "Economic Importance of Ground Water." According to the item, the Waterways Div., Hydraulics Div. and Irrigation Div. of ASCE will cooperate by furnishing a member on the committee. What? No Sanitary Engineers, whose business it is to make economic use of ground water for water supply and other purposes? ? ?

MANUFACTURERS' and EQUIPMENT News

Dolan Succeeds Allen as Mathieson President

E. M. Allen has announced his retirement as President of the Mathieson Alkali Works, Inc., effective Jan. 1, 1944, and the election of G. W. Dolan as his successor. Mr. Allen will continue to hold the office of

G. W. Dolan E. M. Allen

Chairman of the Mathieson Board, a position he has held since 1938. Mr. Allen became president of the company in 1919.

Mr. Dolan joined the Mathieson organization in 1930 and has held various positions of responsibility. Mr. Dolan was elected Executive Vice President of the company in 1941.

SMITH INSERTING VALVES

THE A.P. SMITH MFG. CO. EAST ORANGE, N.J.

Symbol of Quality Since 1889

NO SHUT-DOWNS NECESSARY!

Water shut-offs mean Industrial shut-downs, and this in turn impedes the war effort. A valve insertion job does not necessarily mean that you have to shut down service. With a Smith Valve Inserting Machine you can insert valves with the service at full pressure. These machines are made in 6 sizes for inserting 4" to 36" valves, are simple and easy to operate and do a surprisingly quick, clean job.

Showing a 24" valve installed horizontally under pressure.

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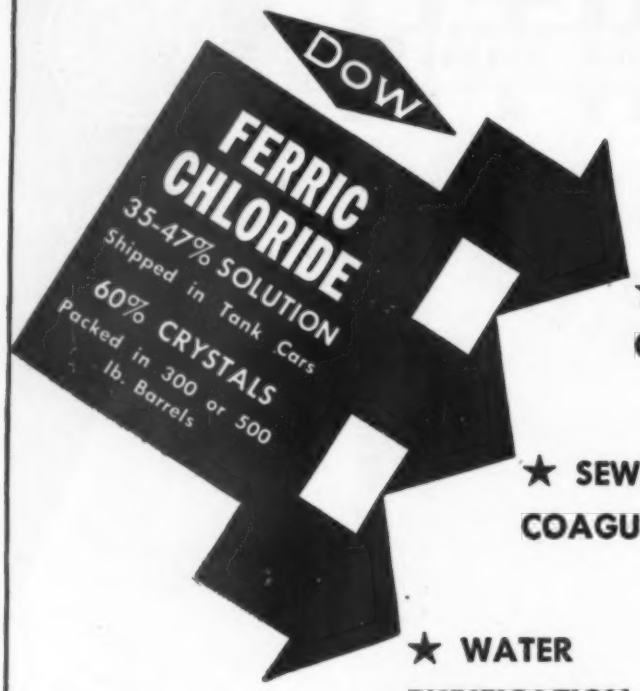

★ SLUDGE CONDITIONING

★ SEWAGE COAGULATION

★ WATER PURIFICATION

THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN

"BLUEPRINT NOW"

At present, all of us are "all-out" for the war effort.

When peace comes we must also go "all-out" to provide jobs — and at the same time put over that vitally needed project.

If we plan *now*, we'll be ready *then*.

RENSSELAER VALVE CO.
TROY, N. Y.

New Pemco-Nordstrom Offices Opened in Atlanta

New offices of Pittsburgh Equitable Meter Co.-Merco Nordstrom Valve Co. have been opened in Atlanta, Georgia. C. C. Moore, who has been in charge of the Memphis office, is District Manager. The Memphis office will be closed at the end of December, so that all southern operations, formerly cleared through Memphis, will now be handled through Atlanta.

"Rod" Reed to Manage New McCarty Pittsburgh Office

The McCarty Co. of Los Angeles and San Francisco, industrial advertising counsellors, have announced the opening of a new office in Pittsburgh, Pa., under the management of R. S. Reed Jr. Mr. Reed has been advertising director of Pittsburgh Equitable Meter Co. and Merco Nordstrom Valve Co. for the past twelve years. In his former capacity Mr. Reed has been well known as the editor of "The Flow Line" and the Pittsburgh - National "Water Journal." In his new position Mr. Reed will continue to handle the advertising of Pemco and Merco Nordstrom companies. The McCarty Pittsburgh office is located at Suite 2205, Koppers Building, Pittsburgh 19, Pa.

R. S. Reed, Jr.

Proportioneers Celebrate 10th Anniversary

%Proportioneers, Inc.% of Providence, R. I., recently held a 10th Anniversary Banquet. Many employees and friends participated in a pleasant evening with group singing and dancing. Rudy P. Lowe, Pres.; Herbert E. Hollberg, Vice Pres.; Henry S. Chafee, Treas., and Earl H. Bradley, Secy., spoke briefly following the dinner.

%Proportioneers% entered the field of flow-responsive chemical

feeding with a small Chicago manufacturer early in 1932, building a device called "Treet-O-Unit". Recognizing that any modern mechanical product reflects the experience, engineering ability and skill of the manufacturing organization behind

it, %Proportioneers% in 1933 associated themselves with Builders Iron Foundry, whose reputation as specialists in the field of flow measurement made them a logical ally. In September of that year a corporation was formed and %Proportioneers, Inc.% moved to its present offices in Providence.

In the past ten years, %Proportioneers, Inc.% has supplied over 10,000 units for the proportional feeding and blending of liquids, a majority of these installations being for water treatment and purification.

Since Pearl Harbor, %Proportioneers, Inc.% has redesigned its portable water purification units, adapting them for sterilizing and conditioning Army and Navy water supplies.

Dwyer, Penn Salt's St. Louis Mgr., Retires; D. W. Graham Successor

Michael B. Dwyer, St. Louis, District Sales Manager for Pennsylvania Salt Co., has retired from active duty with the company, closing a most enviable record of 58 years of active service with the company.

Donald W. Graham, who has been with Pennsylvania Salt for 13 years, is being transferred from the Chicago office to succeed Mr. Dwyer as District Sales Manager at St. Louis.

Robt. H. Clark Co. Moves Into New Plant

A recent announcement from the Robt. H. Clark Co., designers and manufacturers of machine tools, tells of the completion of a new plant at 9330 Santa Monica Blvd., in Beverly Hills, Cal., where facilities

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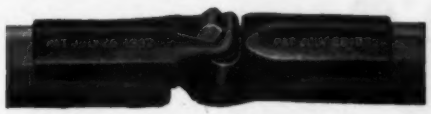
MACHINES LEASED OR SOLD

★ WOODEN & STEEL SEWER RODS • STEEL TAPES ★

★ ROOT CUTTERS • SEWER CLEANING BUCKETS • CABLE ★



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Made of Selected Hickory with strong Malleable Iron Couplings, in 2½, 3, 3½ and 4 ft. lengths. Triple Lock, impossible to buckle or uncouple in the sewer. The tongue and groove feature eliminates wear on hook, increasing the length of service.

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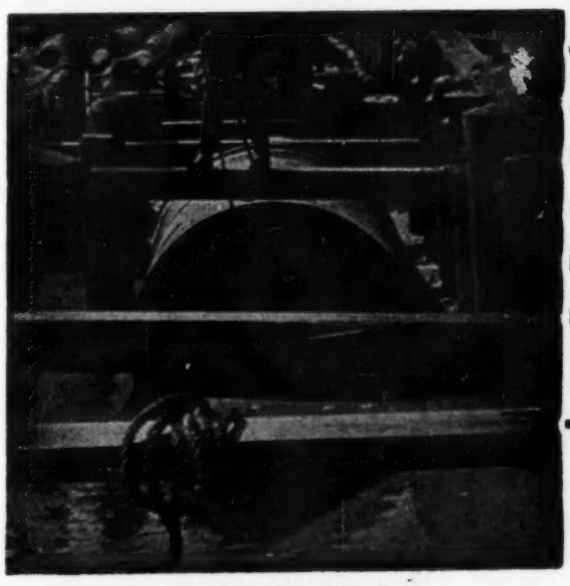

84" pipe—Spring Lake, N. J.

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have been greatly increased for the production of adjustable cutting tools and automatic tapping machine conversion units.

More Army-Navy Awards

A star for "meritorious services on the production front" has been added to the Army-Navy Flag of H. K. Porter Co., Inc.

Niagara Alkali Co. of Niagara Falls, N. Y., has likewise received a star to add to their flag for continuing to maintain high production standards for six months after the original "E" was awarded.

Hooker Electrochemical Co., also of Niagara Falls, N. Y., recently received a second star to add to the Army-Navy "E" flag, indicating twelve full months of continued production at the rate for which the original flag was awarded.

New A-C Sheave

A new sheave, designed for quick and easy mounting and demounting, has just been announced by Allis-Chalmers.

Known as the "Magic-Grip" Sheave, it locks to shaft in one tightening operation. As its tapered split bushing, which accommodates normal shaft tolerances, is drawn further into the sheave, the sheave, bushing and shaft are locked together simultaneously. This positive clamp fit makes sure that the "Magic-Grip" Sheave is perfectly centered and secure—assuring smooth running performance free from backlash and shear.

More complete information concerning "Magic-Grip" Sheaves may be obtained by writing for Bulletin B6310. Allis-Chalmers, Milwaukee 1, Wisc.

"Magic Grip" Sheave

(*Picturing the ease of attaching and removing the sheave, involving three cap-screws.*)

RESETTERS
NOT AVAILABLE
but....

. . . . you should be planning now to improve your water meter settings by raising your too-low meters with this useful fitting.

Learn about RESETTERS now and be prepared.

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Meter Box Co.
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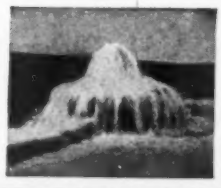
A Size and Type to Fit Your Problem in Water or Sewage Treatment.



WRITE FOR INFORMATION

Welding Trouble Chart

"Causes and Cures of 14 Common Welding Troubles" is a fine new wall chart (size 24 by 18 in.) recently issued by the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. Each welding "trouble" is pictured clearly. Opposite each picture in one column is a list of the causes contributing to that "trouble". Next to the column of causes is a column containing the cure for each of these "troubles". The fourteen troubles shown include cracked welds, distortion, brittle joints, undercut, stresses, magnetic arc blow, irregular weld quality, corrosion, warping, porous welds, spatter, poor fusion, poor surface appearance, and incomplete penetration. This wall chart will be particularly useful to shops where welding is done. It may be obtained without cost from the Westinghouse Editorial Service, East Pittsburgh, Pa.

New Ideal Electric Tachometer

A self-energized Tachometer that can be used either as a "Hand Type" or "Separable Type" is announced by the Ideal Commutator Dresser Co., of Sycamore, Ill.

Essentially the Ideal Tachometer consists of a small generator,

Separable Type Ideal Tachometer

coupled electrically to an electric meter. The generator itself consists of a small, permanent "Alnico" magnet rotor.

The generator and meter are made as distinctly separate elements and coupled together by a precision made bayonet lock. The units may be used together as a "Hand Type" Tachometer or for many applications, including permanent mounting, the generator and meter may be separated by a cord complete with coupling plug.

For further details address Ideal Commutator Dresser Co., 1615 Park Ave., Sycamore, Ill.

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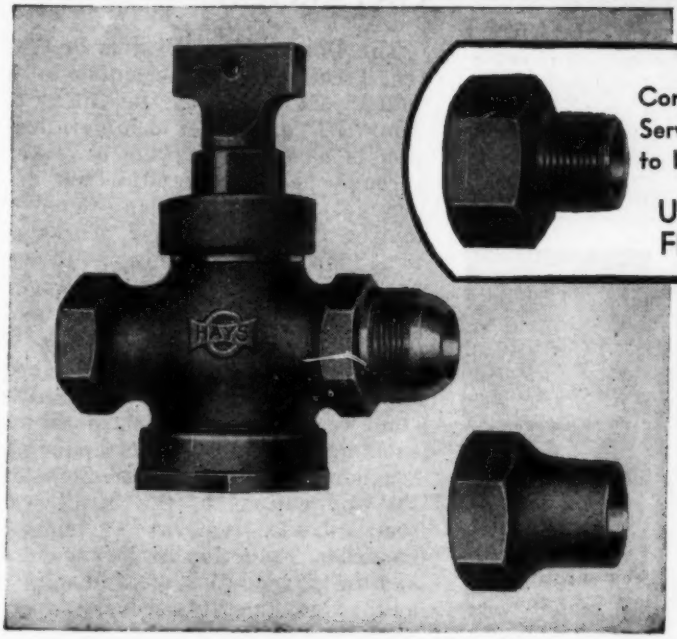

MAKE use of copper service stops in stock when copper pipe is not available. If you wish to convert to iron pipe, use Hays No. 543-R Adapters.

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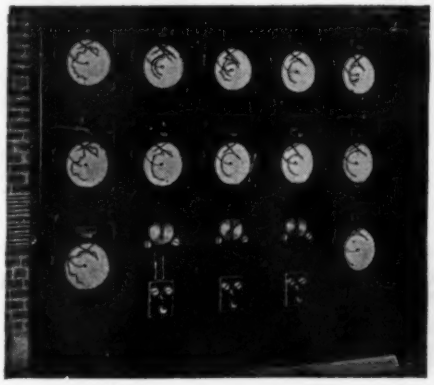

Readings of flow, pressure, temperature, liquid level and other factors are accurately and quickly transmitted from out-of-the-way places to the receiving indicator, recorder or integrator by the Bailey Synchro-Meter.

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Link-Belt Elects Vice-Presidents

Mr. W. C. Carter, President of Link-Belt Co., Chicago, announces the election by the Board of Directors, of two vice-presidents, effective Jan. 1, 1944.

Mr. E. L. Berry, vice-president and general manager of Link-Belt

E. L. Berry

R. G. Bergmann

Ordnance Co., has been elected vice-president of Link-Belt Co., the parent organization. Mr. Berry, who began his Link-Belt career in 1914, has for many years devoted his time particularly to matters of production and personnel.

Mr. Richard F. Bergmann, Link-Belt's chief engineer, has also been elected a vice-president of the company. Mr. Bergmann came to Link-Belt in 1924.

LITERATURE AND CATALOGS

The Dorrco "D-I" System of Water Treatment is presented in a folder just issued by the Dorr Co. The "D-I" system of demineralization is based on passage of water through beds of granular ion exchange material, which removes ionized dissolved matter. The system involves two beds, a cation exchanger, and an anion exchanger housed in equipment of unique and flexible design.

An important feature described in the folder is the use of multi-stage regeneration, which increases exchange capacity while reducing regeneration requirements. Some of the applications of the "D-I" system include removal of simple hardness, reduction of bicarbonate alkalinity, reduction of total solids; and, also, metal recovery from trade wastes. Advantages listed for the Dorrco "D-I" System include low installation and operation costs, no silica pick-up, and flexible operation in any size capacity. Containers may be rubber lined or acid proofed steel tanks, or open wood stave tanks on gravity systems. Additional information on the "D-I" System may be obtained by writing The Dorr Co., 570 Lexington Ave., New York 22, N. Y.

Balanced Monobloc Centrifugal Pumps by Worthington are described in a series of recent bulletins. Bull. W-321-B7C is on the open impeller Type DO pump for use in screened sewage, and industrial wastes. Bull. W-321-B13B presents Steam Turbine Drive Centrifugals. Single stage pumps are shown in Bull. W-321-B14B, and two stage pumps are shown in Bull. W-321-B15. Both the single and the two stage pumps have application in general water service. These bulletins give tables of dimension, specifications, and capacities. Any or all of these bulletins may be obtained from the Worthington Pump and Machinery Corp., Harrison, N. J.

"De Laval Pumping Units at Philadelphia," traces notable developments in the history of one of America's oldest and largest water systems. The very latest pumps ordered by Philadelphia, four 40 m.g.d. units, were built and ready for installation when diverted by order of the WPB to meet urgent requirements of the City of Detroit, Mich., to which they have been leased by Philadelphia. This De Laval Bul. E-1180 also includes in-

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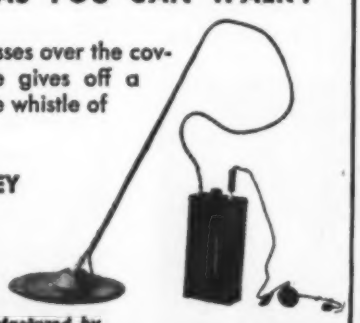

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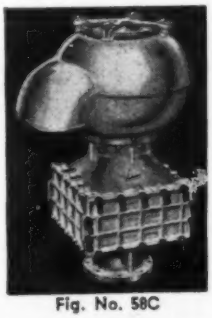

Fig. No. 58C

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teresting information concerning the effect of wear on pump efficiency, tests made six years after installation having shown no measurable loss in efficiency. The bulletin is abundantly illustrated with photographs of the various Philadelphia pumping stations, in addition to flow diagrams showing interflow connections of Philadelphia's pumping plants and filtration systems. Copies of Bul. E-1180 may be had by writing to the De Laval Steam Turbine Co., Trenton 2, New Jersey.

G. T. Packings is the title of a bulletin containing a helpful guide for the selection of packing published by Greene, Tweed & Co. This bulletin tabulates in alphabetical arrangement more than three dozen different fluids handled in process work and general plant services, and lists the correct Greene, Tweed packing for each liquid, gas, and vapor. An addtional tabulation describes the form and construction of each packing and lists typical kinds of equipment for which each one is suited. Tables of sizes and weights are also included. Copies of this informative guide may be obtained by addressing Greene, Tweed & Co., Bronx Blvd. at 238th St., New York 66, N. Y.

Water Production for Industrial and Municipal Use constitutes the title of a booklet published by the Ranney Water Collector Corp. of New York. By ample discussion, clear diagrams, and photographs, the problem of ground water collection and utilization is presented. The booklet discusses low velocity infiltration, development of shallow aquifers adjacent to salt water bodies, water quality, cost of installation and operation, and collectors as infiltration units. A list of several industrial and war production plant installations is given with the capacities and type of each. This interesting booklet may be obtained from the Ranney Water Collector Corp. of New York, Heyburn Building, Louisville, Ky.

Eimco Continuous Vacuum Filters are cataloged in Bull. F-2002 of the Eimco Corp., Salt Lake City. Containing 48 pages, the bulletin presents descriptions, photographs, designs, and applications of the complete line of filters made by this company. One section deals with the general principles of continuous vacuum filtration, another deals with industrial applications of various filters, while a third shows diagrams

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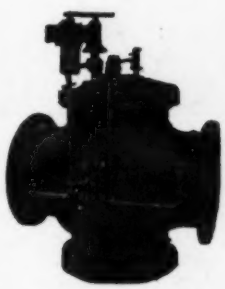

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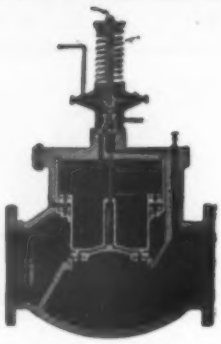

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Included in the bulletin are drum filters, disc filters, valves, accessory equipment and many special filters for industrial and sewage plants. The bulletin calls attention to the test laboratory located in Chicago, Ill. Bull. F-2002 may be obtained by writing the Eimco Corp., Salt Lake City, Utah.

Your Grease Will Make a Grease Spot of the Axis is the theme of a leaflet which Josam Manufacturing Co. of Cleveland, O., has released recently. This folder, as a mailing piece directed to householders, emphasizes the fact that grease can be made into gunpowder. Copiously illustrated and attractively printed in blue and red it gives impressive data on the importance of saving grease and fats, telling how to save this material which is ordinarily wasted. On the last page of the folder is a description and cut of the Josam Grease Interceptor. Based on long experience in design, this grease interceptor is made in various sizes to meet the requirements of private residences as well as restaurants, hotels and institutions. A copy of this interesting leaflet will be mailed on request by addressing Josam Mfg. Co., 333 Empire Bldg., Cleveland, O.

Bio-Activation, Bull. No. 259 is the first of a series of bulletins just released by the American Well Works of Aurora, Ill. In this bulletin is described the process of bio-activation which "is a combination in stages of trickling filters and activated sludge in such a manner that each stage operates under favorable conditions and at greatest efficiency." The bulletin contains drawings showing the layout of equipment and general design, as well as some typical results of the process.

Pre-treatment Grease Flotation equipment and process are presented in Bull. No. 260. Photographs of installations in municipal and industrial plants are shown, along with tables of operating results. Skimming and skimmer operation and design are also presented.

Sludge Pumps is the title of Bull. No. 261 discussing the problem of moving primary sludge and the American vertical and horizontal sludge pumps designed for that purpose. A recommended layout is also shown.

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Rapid Rate Filters are described and shown in Bull. No. 262. A typical installation diagram is given in this bulletin as well as a description of the operation of the rapid rate filter.

Enclosed with these bulletins were two data sheets, one for sewage treatment plants, and the other a report log of water plant operation. These are numbered, respectively, San. 2503, and San. 2487. Bulletins 259-262, incl., and the data sheets may be obtained from the American Well Works, Aurora, Ill.

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8	2.5	4.00	2.25	14.63
10	2.5	5.00	2.25	17.70
12	2.5	6.00	2.25	20.86
14	2.5	7.00	2.25	24.02
16	2.5	8.25	2.25	33.07
18	2.5	9.25	2.25	36.88
20	2.5	10.50	2.25	40.71
24	2.5	13.00	2.50	53.02
30	2.75	16.00	2.50	65.36
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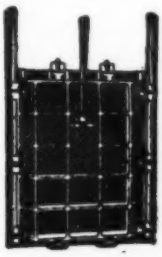

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A LONG LONG TIME

The founders of the Layne Organization realized the tremendous importance of water as a health, safety and industrial necessity. They pledged themselves never to sacrifice quality in the manufacture of Layne Pumps and Well Water Systems. That pledge, to the ever grateful thanks of thousands of Layne Well Water System owners, has been faithfully kept.

Today as always, Layne Pumps and Well Water Systems are still being made of the very finest quality materials. They possess highly important and exclusive features of construction which measureably lengthen their long life. And in addition, they embody outstanding and thoroughly proven engineering ideas that guarantee highest efficiency.

Wherever modern well water producing equipment is used—whether in the United States or in foreign lands, that which bears the name of Layne is definitely recognized as the world's standard by which all other makes are judged.

If your postwar plans call for the use of more water, Layne engineers will gladly cooperate in providing sound recommendations. For literature address LAYNE & BOWLER, INC., General Offices, Memphis 8, Tenn.

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LAYNE

WELL WATER SYSTEMS

DEEP WELL PUMPS

Builders of Well Water Systems for every Municipal and Industrial Need

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Dorrco Doings in 1943

This year, for the first time since the War began, the question is not What or How, but *When,* and without letting up one whit in our war effort, the Sons of Martha realize that the true job comes *after* the Victory celebrations. Peace is harder than war, and the part of peace directly following war is the most difficult of all.

"Careful and troubled about many things" as we will be, our prayer that as a nation and as individuals we maintain a sense of proportion, must be incessant.

Those of us whose work or training has made us realize we are part of this Round World rejoiced over the evidence of Global unity which we had prayed for. Casablanca, Moscow, Cairo, Teheran, are words that thrill! Yet I am sobered when I pick up an editorial in a chain newspaper of large circulation and find in leaded type "Let the Europeans and Asiatics organize themselves." "We should lead by example as we have since 1789."

It seems to me that we were leading by example until December, 1941—and "with our chin" as well!

Untold sacrifices are being made to win. If our people could realize the threat of blind minority pressure groups to nullify our efforts and return to pre-Pearl Harbor Isolationism, they would consecrate themselves to its elimination, except as a relief valve such as long maintained in London's Hyde Park for blowing off the froth of Democracy.

WESTPORT MILL

An extension of our main building to include a Semiworks area is under way. This addition to our services was essential to supply larger quantities of demonstration end products, better facilities between laboratory and commercial plant practices and our continuing expansion in new fields such as FluoSolids, ion exchange, and corrosion control.

Continuing work on Abrasive grading has greatly enlarged our frontiers in the most accurate classification of extremely fine sizes. For a time we operated a small-scale plant for a client until he could complete his own installations.

Alumina's importance under present conditions has brought us 12 different problems and the wide range of our work is indicated by our being asked to handle the leaching and washing of rye grass and alfalfa for vitamin recovery.

Government recognition of our work's importance to the war effort brought us a priority for this Extension. This means much to Dorr engineers. One who had worked South, abroad and in the West for some years, wrote me after coming in for a Westport conference on new developments, "I came away with a feeling of having after all these years caught a full glimpse of 'the spirit that is Westport.' I could not but feel that it is something we could share with others on a very large scale, something bigger than equipment or engineering or any concrete part; I felt that I could visualize Westport in terms of the vital products created through our varied efforts."

PLANT ENGINEERING

This phase continues to expand. We often find it profitable to apply methods developed and demonstrated at Westport to plants designed by us or with our assistance, as with one of a new type for producing alumina, one for the manufacture of a catalyst for oil refining, and one with special features for producing phosphoric acid and superphosphate. Engineering studies and preliminary estimates have been made on a variety of chemical, metallurgical and industrial projects proposed both here and abroad. One complete flue dust recovery installation designed for a large Pennsylvania blast furnace emphasized the value of combining plant engineering and equipment design.

FIELD ENGINEERING

Our field engineers have rendered valuable assistance to clients starting big war installations, which are frequently the first unit built from pilot plant experience.

PHOSPHATES

The need for increased crops, therefore fertilizers, and the great success of the "Super" Hydroseparator (160 feet diam., 35,000 g.p.m.) on large tonnages of valuable Florida phosphate fines —formerly so elusive in recovery plants—has well justified the engineering development work involved, and means the conservation of a great natural resource. The fourth large phosphate sand unit is now being installed.

METALLURGICAL

Two of the last big new copper concentrators —Cananea and Castle Dome—equipped with Dorr Classifiers and Thickeners, have started and emphasis now is being placed on increasing efficiency in existing plants. Witness: addition of heavy-duty Classifiers for washing low-grade iron ores on the Range.

SANITARY

The rush of construction of sewage plants for war camps has passed, and much of this work now is for expansion. Biofiltration, with over 225 plants now in operation, has proved most effective and represents a distinct advance in sewage treatment methods.

Post-war planning is proceeding actively in many areas for new plants, enlargements, and more complete treatment.

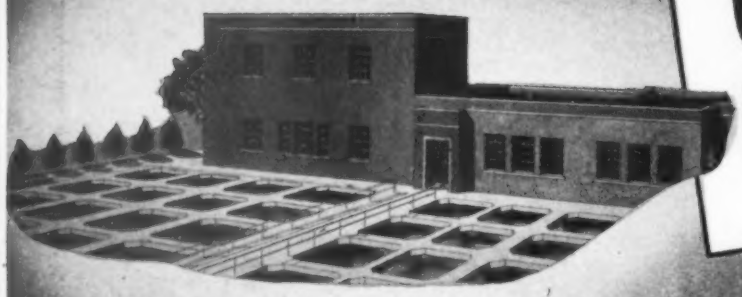
Post-war thinking for us means Global thinking and we realize more than ever the need of cooperation and sharing so that each technical undertaking becomes a rivet to bind the world. It is with the hope that this understanding of a free society patterned on mutual friendship will become universal, that I offer New Year Greetings for 1944.

570 Lexington Ave., New York 22

DORRCO

For now...it's SAFETY-FIRST!

Post-War...it's SAFETY-PLUS!



Meet this dual responsibility with W&T *Chlorination*

RIGHT NOW we are making every effort to keep in continuous service, as long as the war lasts, every chlorinator installation whatever its age. We are supplying necessary replacement parts and giving competent technical service—for SAFETY-FIRST.

AFTER THE WAR, new applications of Break-Point Chlorination and of Fully Automatic Control—new installations of automatic chlorinators, with chlorine flow recorders—and duplicate equipment for emergencies—will be available for the protection of your water supply—for SAFETY-PLUS.

"The Only Safe Water is a Sterilized Water"

W&T "WATCH" WORDS

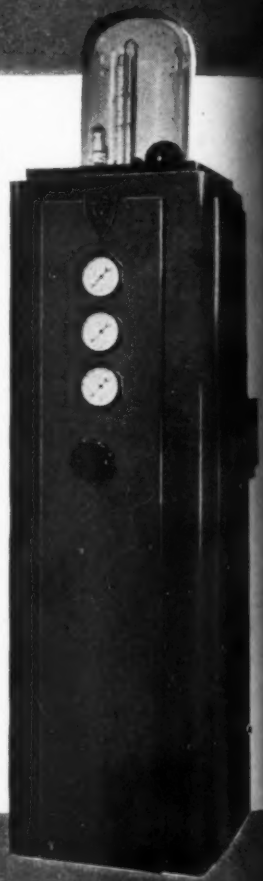
Keep your eye on these keys to post-war chlorination progress:

BREAK-POINT . . . for greater health protection, plus taste and odor control.

DUPLICATE UNITS . . . for 100% safety-insurance, plus peak load reserve.

FULLY AUTOMATIC CONTROL of application, to maintain a definite residual.

SA-162



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